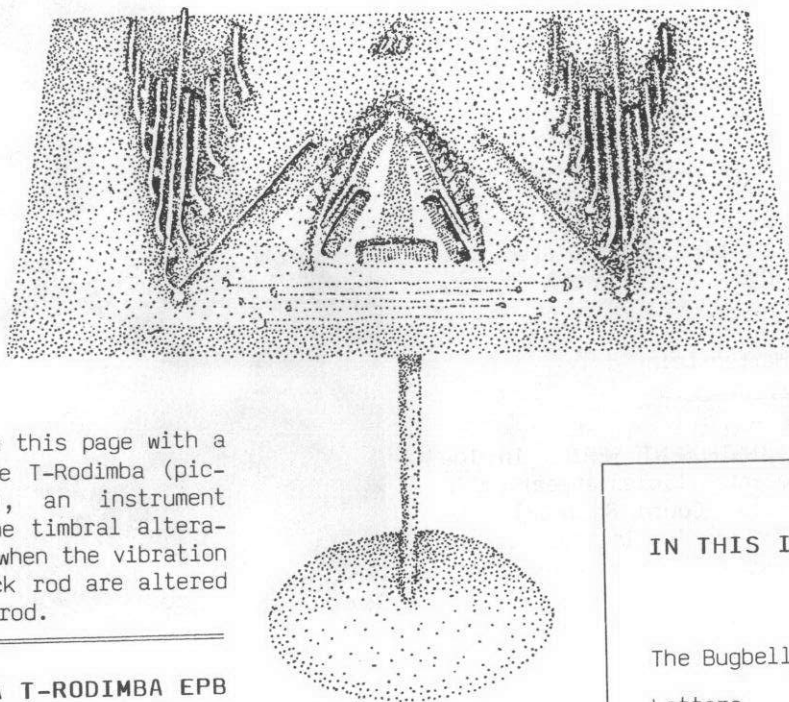


EXPERIMENTAL MUSICAL INSTRUMENTS

FOR THE DESIGN, CONSTRUCTION AND ENJOYMENT OF UNUSUAL SOUND SOURCES

WHAT NOW?

As always, in this issue of EMI you will find all kinds of good things from the world of possible musical instruments -- from seaweed horns to something called the Portable Boood Usic Busking Unit. We start on this page with a report on the the T-Rodimba (pictured at right), an instrument which explores the timbral alterations that occur when the vibration patterns of struck rod are altered by a bend in the rod.



Drawing by Robin Goodfellow

"BUGBELLY" - A T-RODIMBA EPB

by Tom Nunn

"Bugbelly" is a nickname I've given a recent instrument which is one version of a newly developed type of electroacoustic percussion board, the T-Rodimba EPB. The central portion, or "belly," of this instrument utilizes the design of a previous instrument I made called the Bug, hence the nickname. The name "T-Rodimba" derives from the use of 1/4" threaded steel rods (which I call "T-rods") as sounding devices, and EPB is an abbreviation for electroacoustic percussion board.

EPBs are a family of instruments that utilize hardwood plywood soundboards to which are attached various sound-making devices such as threaded steel rods, nails, combs, music wire, springs, highly contorted bronze rods ("zing trees"), and textured surfaces. A contact microphone, or pickup, is used to amplify the instrument. These various devices may be played with the fingers, fingernails, knitting needles, combs, guitar pics, small rubber mallets (rattan chopsticks with surgical rubber tubing over one end), or just about anything else one can think of, striking, rubbing, scraping,

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LETTERS

IN RESPONSE TO THE QUESTION of how to glue superballs to a wooden dowel [raised in EMI's last issue's letters column]:

Use Permatex® Clear RTV Silicone Adhesive Sealant (Part #66B), found at your auto parts store. I drill a $\frac{1}{8}$ " hole in the ball with a brad-point bit (with side cutters) to minimize crumbling of the rubber. Then glue $\frac{1}{8}$ " dowel in place and wipe off excess adhesive.

Jerry Brown

I HAVE A FEW ADDITIONAL TECHNIQUES for players of corrugated tubes. Singing through the tube while whirling it produces a wonderfully haunting vibrato that is particularly effective with glissandos and falsetto voicings or even spoken text. Whistling into a stationary corrugated tube produces some interesting harmonic discontinuities when glissandos or sliding tones are attempted. This "stepped effect" can also be achieved with a slide whistle played into one end of a corrugated tube. Lastly I want to mention a lovely snoring sound that can be produced by rubbing a corrugated tube over the sounding edge of a wood block. NNGGGHHHHHHH!

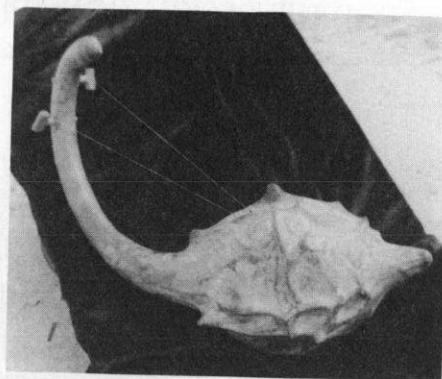
Ward Hartenstein

GLAD TO SEE THE GOURD INSTRUMENT SERIES in The Gourd [this refers to recent articles appearing in newsletter of the American Gourd Society]. The one thing that seems to be missing in that network (gourd growers & craftspeople) is a working understanding of the difference between making historical reproductions of traditional gourd instruments & creating new instruments, new concepts of music & performance & creating OUR OWN new culture based on all that is known. While at the 89 American Gourd Festival it was easy to see that the majority of the artisans are locked into the mode of creating historically accurate reproductions. What's not understood is how that type of craftsmanship is one of stasis & preservation. The gourd is one of the most powerful musical materials to come from the earth itself (& anyone can play them!). In order to guarantee a continual evolution that is alive & changing, the people that grow them are the same people who best understand the gourd's structural possibilities, thus the people most capable of inventing new uses, new sounds & noise, new rituals using the "fruits" of the earth.

Incidentally, we've made a number of gourdophones from long-handled dippers using a simple musical concept I call "hand-print intonation." The idea being that instead of trying to tune the gourd to an intonation system that is foreign in its relationship to its performer, the gourd is

tuned to how the player's hands fit & finger most comfortably on that particular gourd. Thus each gourd produces a music that is microtonally unique to the player's handprint. (While embouchure is a factor as to what notes & sounds can be produced, the placing of tone-holes based on locations intuited by the fingers themselves creates a fundamental pitch base from which all other sound, virtuoso or non, come.

Right:
DIVINE
MONOGOURD,
Elizabeth
Was, 1989.

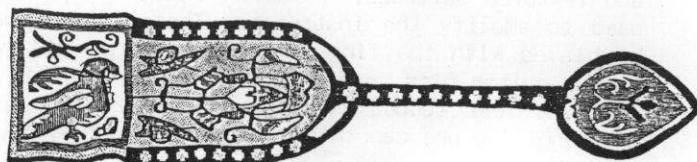


Left:
MARANKAN
GOURDOPHONE,
using
hand-print
intonation,
Miekal And,
1989.

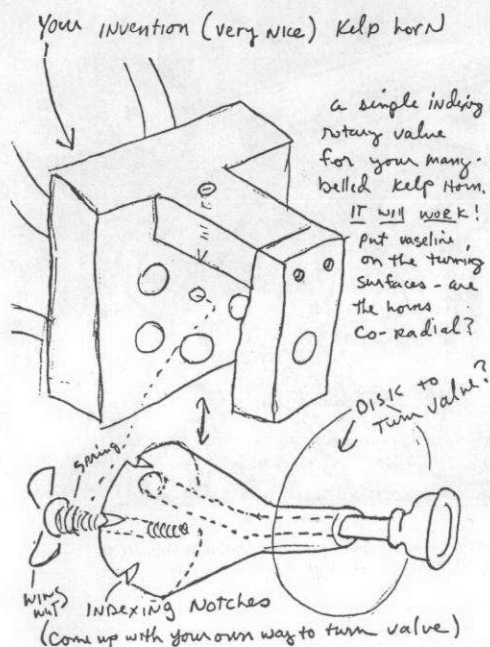
The Aerial, box 15118, Santa Fe, NM 87596, a new music/world music CD magazine, has just released a short improvisation by our group, FLOATING CONCRETE OCTOPUS, which uses gourd instruments & a sampler. The piece is called "The Burial Song." [See this issue's Notices section for more on this collection.]

We are going to try to grow some shaped gourds this year, will let you know if we have any success ...

Miekal And
1341 Williamson
Madison, WI 53703



LOVE YOUR KELPHORNS [described in EMI's last issue] -- looks like a great material to work with. I've never seen that kind of kelp in the East. I like the look and idea of your "not-so-successful" multi-kelp horn so much I've come up with a simple idea that might make it a success (and more of one aesthetic than the "trumpet gone native"). I hope you're interested enough to try it out.



[Letter writer Bob Grawi's sketch for an improved valving system for the "not-so-successful" multiple kelp horn pictured on page 8 of EMI's last issue. In that version, in brief, a trumpet mouthpiece inserted in the opening in the rear face led to a flexible tube which could be directed to any one of the six holes in the second (half-hidden) face, which in turn led to six horns of different lengths. In practice it was difficult to quickly and dependably make an aligned and well-sealed connection at the 2nd face; thus, Bob's suggested improvement shown here.]

I worked in the same area one time -- got interested in side hole trumpets via serpents. Wanted to make a large bass instrument you could play over an octave's range. I thought if I could coil the tube up into a spiral the fingerholes would be far apart from each other & still wind up close enough for a hand's reach without keys. What I wound up settling for was an extra large horse conch -- a naturally tapered spirally wound tube. I just drilled six holes in the end and tuned them by making them larger, and had a diatonic scale of an octave and a half! If kelp is flexible enough when wet, try winding one into a tight spiral -- could be very interesting.

Also noticed the end of one of your bells was chipped -- try making rings out of brass or some other heavy wire & epoxy right on the bell edge -- this is a classy way to reinforce the ends. Use wire the same thickness as the kelp.

Bob Grawi

NOTES FROM RECENT CORRESPONDENCE

CAT KEYBOARD

In last February's issue we asked whether anyone had information on the source of an anonymous early depiction of a cat keyboard -- a keyboard, played by a pair of aristocratic looking hands, with a set of squalling kittens for sounding elements. Francois Baschet writes:

The engraving is strange for two reasons: A cat is not a bird and is not known for its songs. Second, the piano is played by a lovely woman. This is weird. Cat pianos were used in the middle ages in black magic ceremonies, not generally by sweet girls. Here is a photocopy from The Sorcerer's Museum. This book was first published around 1880 by Grillot de Givry.

I think that Father Kirchner also referred to a cat piano. I went through his book written in Latin in the 16th century when I studied Vitruvius' hydraulic organ. I saw no cat piano, but engravings are rare in this book. There might be only a description.

(continued overleaf)

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phone call is suggested before sending
articles. Include a return envelope with
submissions.

At right is the photocopy of the engraving that Francois Baschet refers to. Below is the title page of the work it is taken from, and below that Francois' translation of the relevant passage from de Givry's text.

Grillot de Givry

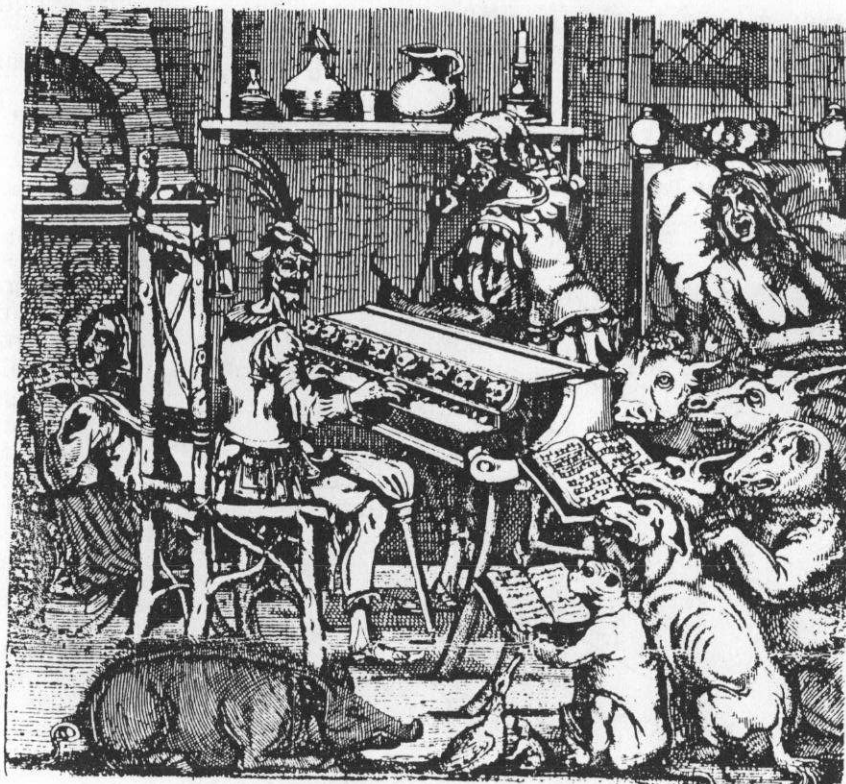
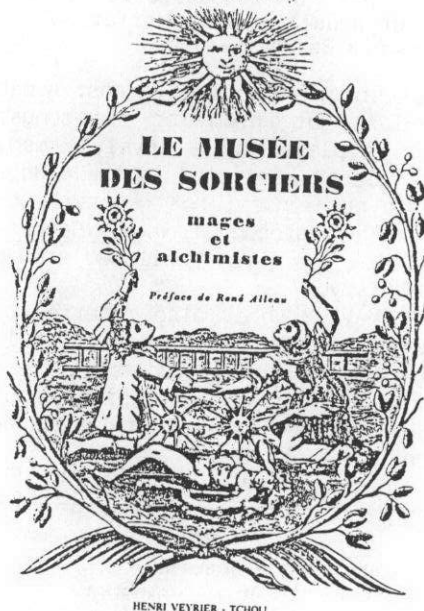


Fig. 118. La lecture du Grimoire, par François van den Wyngaert. Estampe du début du XVII^e siècle. (Collection de l'auteur.)

Translation from de Givry:

In the middle of the composition, a crippled wizard plays on a really diabolical instrument. It is a kind of clavichord imitating the one that had been presented, in the past, by a certain monk to King Louis XI, made of a wooden box in which eight cats are locked -- one octave -- Only the heads and the paws are sticking (?) out, as a keyboard. The man, happy with himself and bantering, pulls the paws to make the cats scream symphonically. Another man, behind the instrument, pulls the cat tails to get another type of sound. The whole thing would probably produce a horrible cacophonia whose devilish character is precisely stated by the presence of an owl perched on the wizard musician's chair, and of a bat hanging from the back of said chair.

More recently, some new cat music has been recorded by Terry Fox. The Labyrinth Scored for the Purrs of 11 Cats is a ninety minute work using recorded cat purrs to realize a score whose structure is conceptually derived from the layout of the labyrinth at the Chartres Cathedral. The piece is available on cassette from Het Apollohuis, Tongelresestraat 81, 5613 DB Eindhoven, Holland.

FROM THE PAGES OF EXPERIMENTAL MUSICAL INSTRUMENTS, VOLUME V

EMI's Newest Cassette Tape
Is Now Available

Yes yes! From the Pages of EMI Volume V is being released concurrently with this issue. It contains music from instruments featured in the six issues of EMI Volume V, from June 1989 through April 1990. A dozen different instrument types appear, including Joe Barrick's one man band set up, Sarah Hopkins' whirlies, Hans Reichel's Pick-Behind-the Bridge Guitar, Frank Giorgini's Udu Drums, Darrell De Vore's Windwands and Spirit Catchers, Bob Phillips' Bellow Melodica, Dudley Duncan's Cosmic Koto, and Richard Waters' super-ball mallet sounds, as well as a variety of seaweed horns, saxes and oboes, miscellaneous whirled instruments, mirliton flute, and a mess of balloon instruments. Great stuff!

The Volume V tape, as well as its predecessors Volumes I through IV, are available to EMI subscribers for \$6 apiece, and to non-subscribers for \$8.50. Checks should be made out to Experimental Musical Instruments, PO Box 784, Nicasio, CA 94946.



SOUND SYMPOSIUM,
NEWFOUNDLAND, JULY 4 - 14, 1990

The coming Sound Symposium festival will include a special focus on new instruments. Don Wherry, the festival director, writes:

Once every two years Sound Symposium presents eleven days of concerts, workshops, gallery exhibitions, installation works, Harbour Symphonies (music composed for the horns of ships in St. John's Harbour), outdoor exhibitions and performances. Musicians, artists and experimental instrument builders come to Newfoundland from many parts of the world to meet, collaborate, share ideas and take part in the many symposium activities throughout the St. John's area. This year instrument makers and experimental sound sculptors include Gordan Monahan, Laura Kikauka, Gayle Young, David Prentice, Kenneth Newby, Bill Napier-Hemy, Kathy Browning, Sylvia Bendzsa, and Michael Burtch (Canada); Bill & Mary Buchen, Tom Guralnik, Susan Rawcliffe and Ron Kuivila (U.S.); UAKTI (Brazil); Die Audio Gruppe (West Germany); and Jacques Dudon (France).

An exhibition of sound sculpture and experimental musical instruments will take place during the symposium. "Sounds of Invention," curated by instrument builder and composer Gayle Young, will be mounted at Memorial University Art Gallery in St. John's. It is perceived as a visual and sonic exhibit. The instruments will be people-friendly, that is, they are to be played by members of the public in this gallery setting, and orchestrated in such a way that interaction may occur as they play.

During the course of Sound Symposium, workshops will be given by these artist-builders, and a special roundtable discussion is planned to give more focus to the growing interest in hand-made instruments.

In addition to this particular direction, new works of music, art, dance, film, electronics, voice and theatre pieces will be featured from a rich, diverse selection of artists from Newfoundland, Canada, the United States, Brazil, Great Britain, West Germany, France and Czechoslovakia.

Come and share with us in our 5th Celebration of Sound in the unique audio-visual, cultural laboratory of Newfoundland!

Don Wherry
Artistic Director of Sound Symposium
81 Circular Rd.
St. John's, Newfoundland, Canada, A1C 2Z5

For further information call:
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Balungan, a publication of the American Gamelan Institute. Information on all forms of gamelan, Indonesian performing arts, and related developments worldwide. Subscription (three issues) \$12 individual, \$16 foreign, \$20 institution. Archives Distribution Catalog, listing tapes, monographs, scores, and videos, \$2. Box 9911, Oakland CA 94613.

Frog Peak Music (A Composers' Collective). Publishes and distributes experimental artist-produced books, scores, tapes, and innovative music software. Catalog on request. Box 9911, Oakland CA 94613.

Musicworks: The Canadian Journal of Sound Explorations. Journalistic and audio perspectives on all aspects of music and music-making. Subscription (3 issues annually) \$26, includes cassettes. Sample issue (28 pages) with 60 min. cassette, \$8.75. 1087 Queen St. West, Toronto, Canada M6J 1H3. (416) 945-4458

1/1: The Quarterly Journal of the Just Intonation Network, David B. Doty, editor. Serves composers, musicians, instrument designers and theorists working with tunings in Just Intonation. One year membership includes subscription. Individual, \$15 US, \$17.50 foreign; institution \$25. 535 Stevenson St., San Francisco CA 94103. (415) 864-8123.

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Soundings Press. Since 1972 Soundings Press has published an annual anthology of scores and articles by today's young composers, and composers active earlier in the century: Nancarrow, Harrison, Bowles, Cowell, Partch, Revueltas. The radical edge of contemporary American music. Free 16-page catalog upon request. PO Box 8319, Sante Fe NM 87504.

TOWARD A MUSIC OF THE HYPERSPHERES

By Buzz Kimball

In conversations prior to the publication of this article, author Buzz Kimball commented that he would try to go easy and write something that would not offend TOO many people. One might ask, "how could an article on microtonal ensembles offend people?" But Buzz is an observer and commentator as much as he is an instrument maker. In describing the instruments of an accessible and affordable microtonal ensemble, he has come up with a few things to say on peripheral subjects as well.

Should the making of unconventional instruments be seen as a stance in opposition to restrictive external forces, or simply as an act of creative expression? Here are some thoughts on that subject, and here too are practical ideas on instruments for intonational exploration.

Environment, more than anything, influences what a listener deems to be good music. Music at its bare is simply a chemical reaction; the hair-like cilia of the inner ear convert mechanical vibrations to electro-chemical neuron signals. Many theories of musical organization exist; in fact, a huge literature surrounds the western 12 tone scale. But perhaps it is the dead weight of tradition that holds the piano scale in such esteem. Conventions are probably the greatest barrier to rational inquiry and progress in music. The hearing mechanism is completely and totally aurally neutral, and it is probably only through "proper indoctrination" that we come to know what we like.

There is a noticeable lack of individuality in contemporary music. MTV always seems to sound

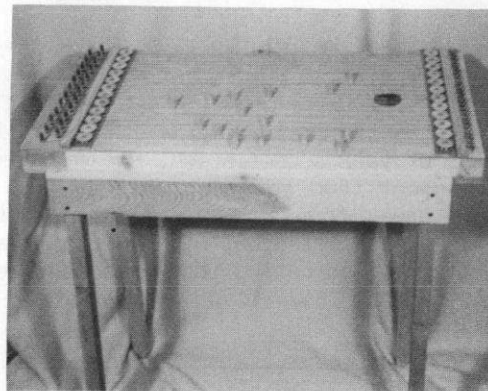
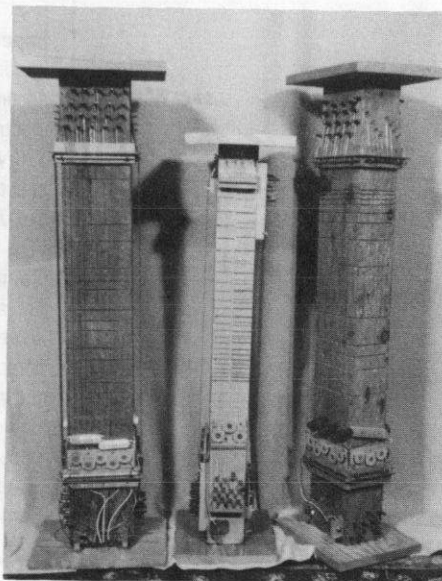
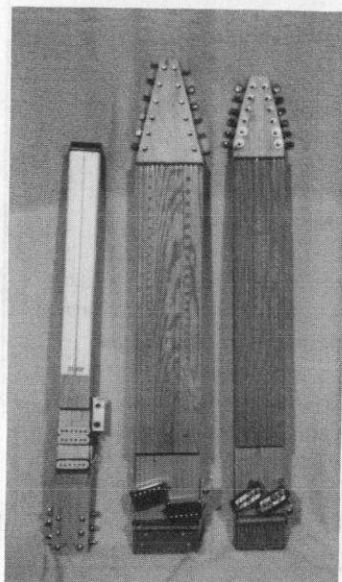
alike; orchestral performers look ready to fly apart at the seams from the frenzied ceaseless motions. Against this backdrop, it may well be that the prime directive for contemporary musicians is to explore new sounds on new instruments. Whether the creative musician must rebel against human exploitation and subservience to the dehumanizing factory system (ergo welfare/welfare state), or just take a hint from nature and gyrate towards a musical system which is more consistent with the bio-chemical need which it fulfills, becomes a moot point.

Looking back at my own work, it seems surprising that I actually built any instruments, much less an ensemble of microtonal instruments capable of experimenting in a variety of equal temperaments and forms of just intonation. Having rejected our frivolous materialistic society as an adolescent, it seems only logical that I would fall afoul of chemical addictions on becoming an adult voting member of our interesting but decadent "American way of life." I really do think that exploring the forbidden sonic spectrum is what helped me break out of chemically-induced inertia. Playing a microtonal instrument does, quite literally, put infinity in your hands. So - no more living in "beam me up, Scotty" land. Get a piece of real adventure; not some fantasy dreamed up by the Hollywood mogul sluts to part you from your money.

But, of course, a vessel is needed to contain musical sounds in our universe for their brief visit.

Four basic elements of new music design are: functionalism, flexibility, finances and floor-space. Being a functionalist suggests that ornate decorations and shiny metal are undesirable qualities in an experimental instrument. They take time and resources better spent in making an

Far left: NOVOSLIDE GUITARS #2, 3, & 4.
Left, L-R: BASS BEAM, SCREAMING
YELLOW ZONKER, HARMOLYRA
Below: ACOUSTICAL HARMONIC KANON
Right: AMPLIFYING HARMONIC KANON
Far right: NOVOHARP

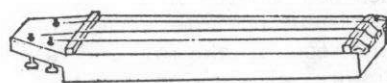
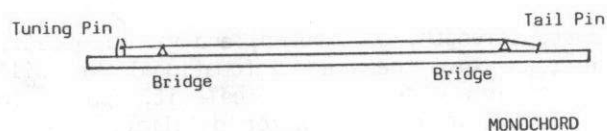


instrument sound better, and besides, it can be a real drag to strip off reusable parts from an instrument that a great deal of effort has been devoted to. Once when my microtonal guitar collection had become too large, I decided to dispose of two mangy specimens that never seemed right despite immense labors that had gone into them. The only consolation I had was the recovery of the hardware, which enabled me to build a couple of slide guitars, instruments I had wanted for some time.

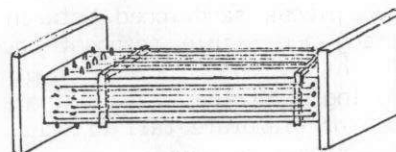
It would be nice to have a single instrument able to playing all the experimental scales, as in sliding instruments capable of continuous pitch gradations. A flexible intonation instrument is desirable because of finances (one instrument, many possible scales). But there seems to be a trade off between ease of playing and what is possible to play, since it is more difficult to accurately select specific pitches from an infinity of possibility. And a fixed pitch instrument has the advantage that it will entice one out of stale patterns and into trying and hearing something altogether different.

The wonders of Reaganomics have made materials expensive, but it is possible to build a variety of good sounding instruments capable of a full range of expressive experimental intonations. And since two thousand units in an eight hour shift is not a consideration, expensive power tools are not a requirement. Hand saw, drill, hammer, and screw driver are more than adequate to start.

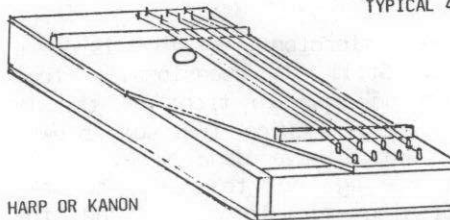
String instruments for intonational exploration may be plucked or bowed, fretted or played with a slide. If flexible string tuning is not needed, piano or zither pins are the most cost effective tuning mechanism. Obviously, tuning gears are too expensive for instruments with large numbers of strings. Slide guitar provides a great deal of flexibility in intonation, but it can be a difficult and demanding instrument, since there aren't any basic patterns. Instead there is an indeterminate flux. Slide instruments can have a group of strings on just one side of the instrument, or on two or more sides. By having sets of strings



BASIC SLIDE GUITAR



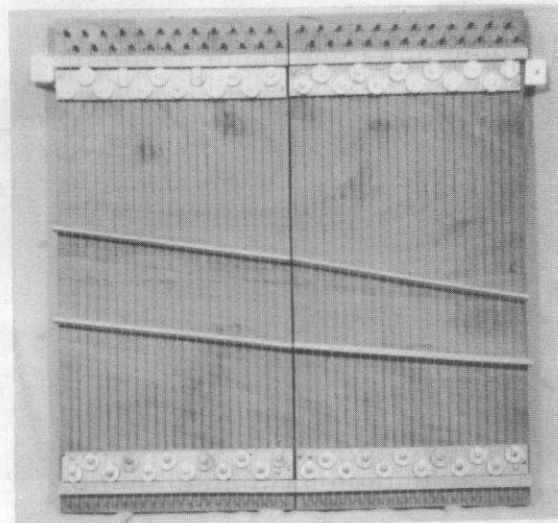
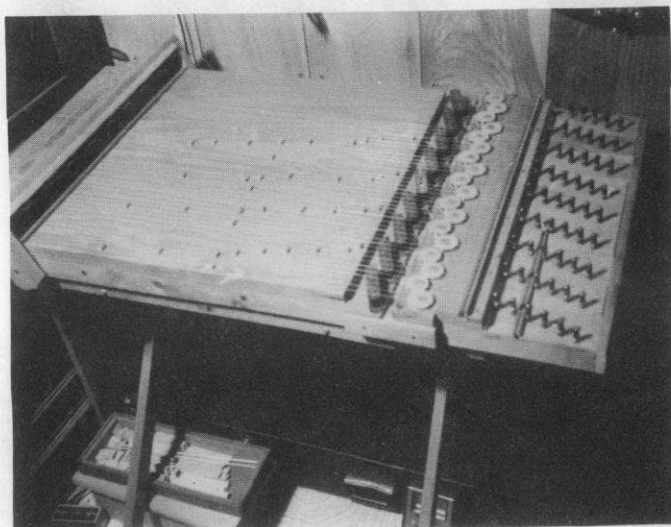
TYPICAL 4 SIDED SLIDE GUITAR



HARP OR KANON

in different tunings on each side, the basic 4x4 or 6x6 beam can provide a useful instrument packed with a lot of pitch relationships in a small place. A 2x4 or 2x6 can provide a foundation for a two sided slide instrument. A nominal amount of money for tuning gears and pickups can make for an effective lap slide. I generally utilize guitar pickups, which are configured for six strings, so I have to use 6 or 12 strings in a group. A steel string of a given gauge and length has over an octave of useable range so a great deal of flexibility in tuning is available.

Plucked open string instruments can provide a set of discrete pitches, in contrast to the slide's continuous pitch change. I have found a simple inexpensive design for harmonic kanons and microtonal harps. Nor is it an original design; I just don't remember where I picked it up from. It fulfills basic considerations such as material



cost, strength, good sound, and visual appeal, as well as compactness and intonational flexibility. The cigar box design, as I call it, appears to be a derivative of the hammer dulcimer. Never ever being able to find spruce soundboards in the width I needed spurred me on to using some scraps of 1/4" fir luan. Although too thick for use as soundboards for instruments with nylon strings, this material sounds excellent with steel strings and is ideal for electro-acoustical applications. Wood pieces sandwiched between luan will make a strong and simple resonant sound box. The location of the tuning and hitch pins will control the spacing of strings and eliminate the need for head nuts or elaborate tail bridges, and any thickness of string is proper.

Trying to create a microtonal ensemble is quite an arduous task. Still, I occasionally feel guilty while plopping down in front of the TV (plug-in drug) or while sucking down some brews, and wonder if I would have done more. I was warned over a decade ago not to expect to make friends for pursuing microtonality. And the advice was correct. Although things have loosened

up a bit, the economics of microtones does have a tendency to preclude it from the marketplace.

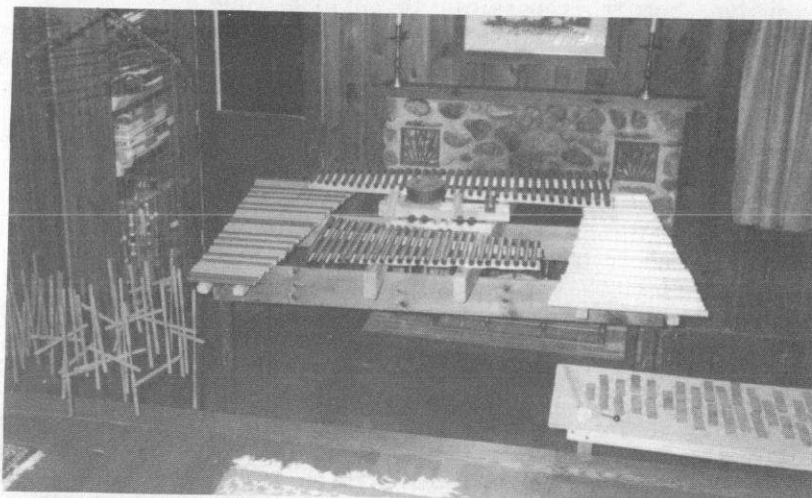
1976, Syracuse, New York. Some friends of mine -- Jack, Steve, Corey ... we hit the rock shows coming through town at the war memorial. Kiss, Grateful Dead, Blue Oyster Cult. Is this supposed to be entertainment or a war zone? Best part of the show is the Jack Daniels. But I would allow that it is less boring than philosophy class.

After that fall I decided that I didn't have to exercise my right to pay for the privilege of being abused. But, less a rebel without a cause than, to paraphrase Wilhelm Reich, "nothing to do, no place to go." In many ways music is packaged as a panacea to our society's myriad economic and environmental ills. Or, at least, a getaway from the stress and strain of life in general. Escapism may make one a survivor but it won't change things.

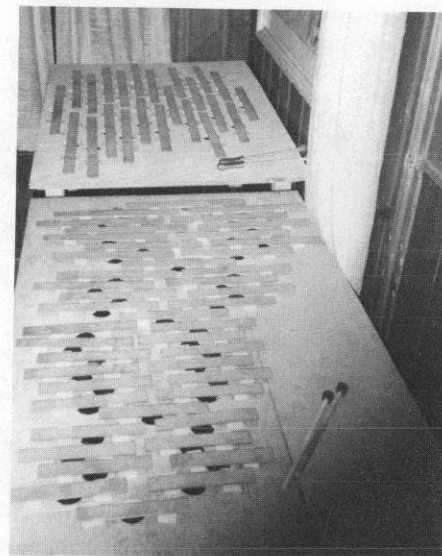
Having gone from the piano to the electric guitar, I immediately started refretting my guitars to microtonal scales when Ivor Darreg's article appeared in Guitar Player in February, 1978. [See also the author's article on refret-

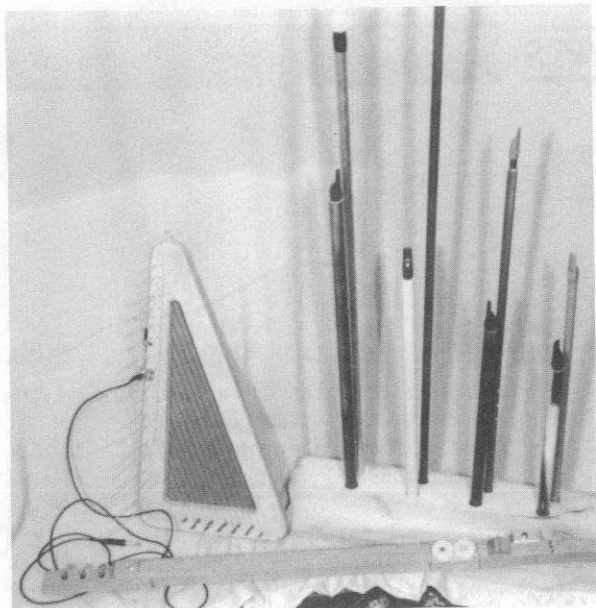


Above left: REFRETTED GUITARS -- 22 ET, 22 ET, 31 ET, 31 ET.
Above right: THE METAL ROOM IN THE TUBLEY PALACE --
Great chimes in 19 ET, Tubulons in 17, 13 & 19 ET and
an 18 tone just.



Below Left: TUBULONS & 22 JUST METALLOPHONE
Below right: Detail -- 22 NOTE JUST METALLOPHONE with
generalized bar pattern (in progress)





Above left: Miscellaneous: STICK HARP, FLUTES, and (only partially shown) LONG BOWED STICK INSTRUMENT.



Right: WALL TO WALL MICROTONES, or "how note to get tripped up on a microtone."

ting in EMI Volume III #6, April 1988.] About the same time I got a copy of Partch's *Genesis of a Music* [New York: Da Capo Press, 1974]. I have two major grievances with the bizarre cult he seems to have spawned. In *Genesis*, Harry jumps straight from the 5-limit ratios to the 11-limit. The 7-limit is ignored and the 9-limit is dismissed. *Genesis* is a good introduction to Partch and his art but not a good handbook for learning just intonation. Also, Partch's early recordings are not readily available, only his later work. In ten years I have yet to introduce anybody to a later Partch recording and get a positive response. I was much more interested in applying just intonation to electric instruments and never really could justify the material cost or provide enough space to directly copy a Partchian instrument. I was intrigued by the design of the harmonic canon, but in retrospect I envisioned a design which is a multi-string monochord and quite different from Partch's design.

I don't consider my instruments to be my children, since I have always borrowed more than invented. But I may have lost as much as I gained in trying to adapt conventional designs to non-conventional intonation instruments. Many times I had tried to imagine what Carillo's pianos and Novarro's harps would sound like. It was only after building a simple electro-acoustic harmonic canon that I realized the two side by side would provide a simple, easily transportable instrument. Hence, the novoharp, capable of an octave or more in a wide range of higher order equal temperaments.

Probably the easiest metal to work is electrical conduit. A quite pleasing tone is produced from the pitch variation which is an inherent by-product of the imperfections in the tubing. The tubulon (the name often given to conduit marimbas) is a very underrated instrument which anyone can

afford and make in a couple of different scales. Not having to be tuned between uses, they are a compelling alternative to watching TV. Sort of the junk food microtonal instrument, good for indulging when lacking concentration or discipline.

One instrument that I wanted for over a decade was, of course, a Partchian marimba. However, several years ago I decided on an instrument with metal bars instead, since the supervisor at a former jobsite let me pick through the scrap barrels in the back of the fabrication plant. After collecting bars in four metals and hundreds of widths and thicknesses I picked a type I liked the most. Mild steel seemed preferable to aluminum; steel has more inharmonicity and also will drive electro-magnetic pick-ups, unlike aluminum. Aluminum also cools rapidly and will clog the pores of a grinding wheel. Needless to say the bars lay around for more than a year, then a couple of dudes drove up from NYC and bought two tubulons. With the money gleaned from that sale I was able to buy a metal cutting bandsaw, and tuning the bars became feasible. I set to work on a twenty-two note just, 111 bar metallophone. After three years it is playable, but still needs resonators and pickups.

The fact that my instrument collection works together as an ensemble is both intentional and happenstance. Fundamental rules that ensure a successful microtonal instrument are: be generous in the number of pitches per octave included, and maintain fairly close and accurate control over pitch. It is possible to only have a handful of notes available on a simple instrument and produce a great deal of melodic charm, but to explore the infinite possibilities of 20th century liberated music, the old party line prevails -- "the more, the merrier."

HORN FROM THE SEA: BULL KELP Part 2

Another article in EMI's series on natural materials in instrument building.

By Bart Hopkin

This is the second half of a two part article on kelpwinds -- musical instruments made from the seaweed called mereo cystis, or bull kelp. The first half appeared in EMI Vol. V #6, April 1990.

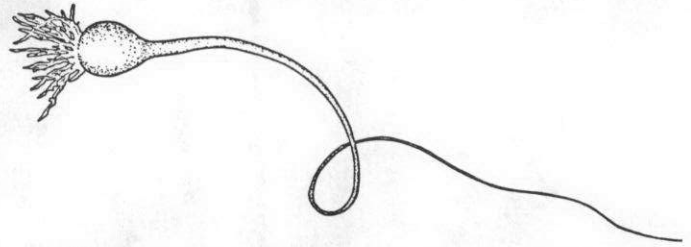
In the first part of this article, we hailed dried bull kelp as one of nature's most inviting sources for tubes of gradually expanding bores, and went on to discuss how great this is for making natural trumpets and related instruments. Saxophones, too, have conical bores in their familiar brass form. How about a kelp sax, then?

KELP SAXOPHONES

It is indeed possible to put a standard saxophone mouthpiece and reed on an appropriately sized and cut dried kelp horn. The resulting instrument will speak with an unmistakable saxophone voice. The tone for some horns may be only so-so; for others it may be surprisingly powerful, or very beautiful, or both. The mouthpiece from any member of the standard sax family will do, as long as the size of the kelp horn corresponds roughly with the size of the sax the mouthpiece was intended for. Clarinet mouthpieces are similar to sax in most respects, but they aren't as effective in this application, because of the nature of the joint between the mouthpiece and the barrel of the instrument.

Saxophones have a disadvantage relative to trumpets and other lip-buzzed instruments. Without help, they do not overblow the pitches of the overtone series very reliably. That means that, while you can dependably play through several notes of the series on a natural (valve-less) trumpet, a "natural saxophone" is likely to be confined to one or two very widely-spaced notes, plus various maverick squeaks and squeals.

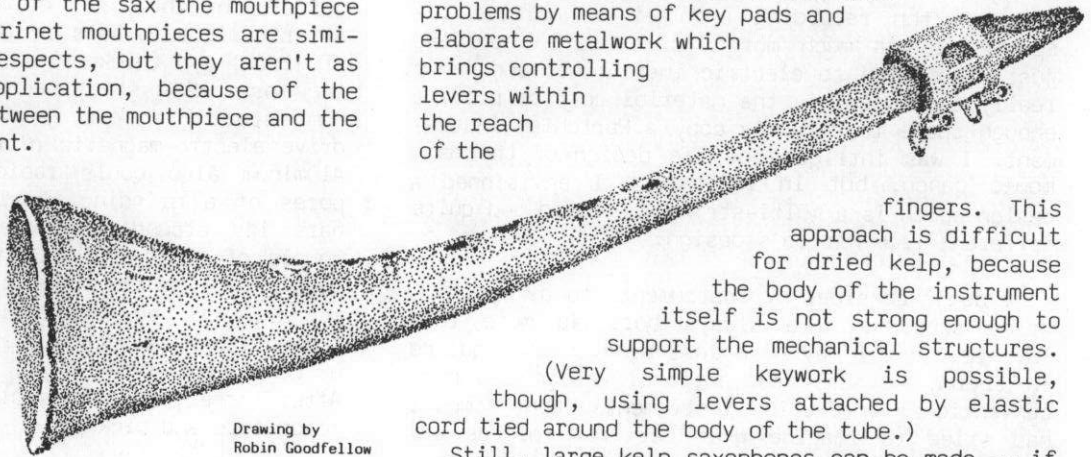
And so we turn to finger holes. Saxophones and other woodwinds are much more amenable to the use of side holes than are trumpets -- that's why in contemporary instruments we have woodwinds with sideholes but brass with valves. We won't address the broader subject of tone hole placement here, but suffice it to say that it is not difficult to



drill a series of side holes along the body of the instrument, and produce some kind of scale or other. Even without calculating tone hole placement, you can produce very agreeably tuned scales by drilling small holes, one at a time, and fine tuning by slowly enlarging the hole, which raises the pitch for the hole in question. If you overshoot the mark, you can lower it again by somehow partially re-covering it -- sticky tape is often sufficient, if inelegant.

Particularly with seaweed, with all its peculiar shapes, it is essential to locate the holes in such a way that fingering will be natural and easy. For straight seaweed horns this is a matter of common sense; while for some oddly shaped, twisty pieces, ergonomic tonehole placement may call for some careful forethought.

For large instruments, a difficulty arises. The hole spacings required to produce useful scales must be wider, and may exceed the reach of the fingers, making for an unplayable instrument. In addition, larger instruments often call for larger holes than a finger can cover. Large orchestral woodwinds get around these problems by means of key pads and elaborate metalwork which brings controlling levers within the reach of the



Drawing by
Robin Goodfellow

fingers. This approach is difficult for dried kelp, because the body of the instrument itself is not strong enough to support the mechanical structures. (Very simple keywork is possible, though, using levers attached by elastic cord tied around the body of the tube.)

Still, large kelp saxophones can be made -- if one is willing to accept a limited set of available pitches. Such limited scales often turn out, by chance as much as by design, to be very lovely in odd and idiosyncratic ways.

I have made a fair number of kelp saxophones, in varying sizes. The majority of them I abandoned unceremoniously, either because the tone was unexceptional, or because I didn't especially like the tonal relationships I had created by my finger hole placement and sizing, or because I hadn't succeeded in making something easy and comfortable to finger. But two of my kelp saxophones I really

loved, and I've kept them and played them often. One was made using a mouthpiece for soprano saxophone (the tiniest of the standard saxophone family and a relative rarity). The body of my kelp instrument, exclusive of mouthpiece, is only nine inches -- shorter than a soprano recorder. It has eight closely spaced fingerholes allowing for a mostly chromatic octave. A tiny register hole, located on the underside just below the mouthpiece where it is accessible to the thumb, allows for controllable overblowing of the octave, which is well in tune. The bottom note is Bb above middle C (a third below that of the piccolo), and the second register, starting an octave above that, extends up about another 5th or 6th before uncontrollable squealing takes over. The tone quality is piercingly brilliant, which makes those high notes seem very very high indeed, and knifelike in their fine edge. But the outstanding characteristic of the soprano kelp sax is this: it is inexplicably, mind-bogglingly loud.

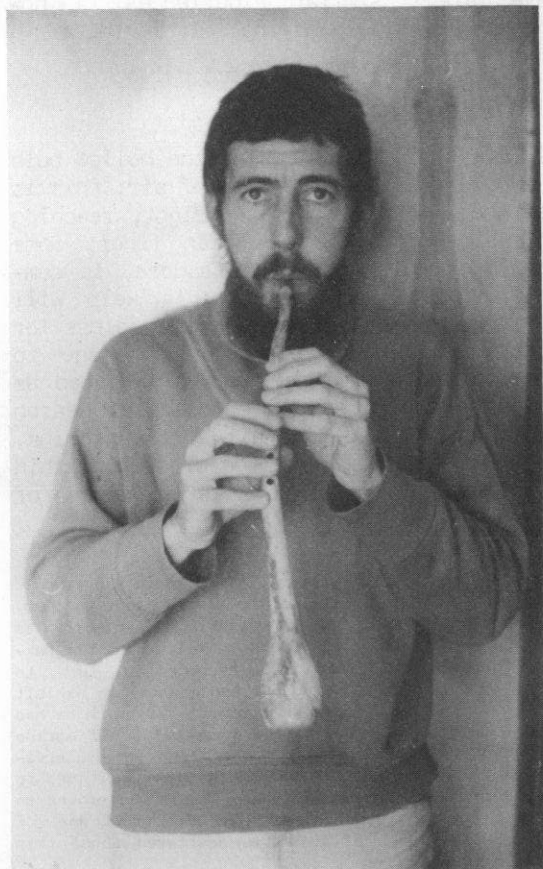
Why this particular piece of seaweed should manifest such an extraordinary musical personality, I have no idea.

My second favored kelp saxophone was made to fit a tenor sax mouthpiece. It's an awkwardly looped shape of a little less than five feet in



Above: KELP TENOR SAXOPHONE, SOPRANO SAXOPHONE, AND OBOE.
Below: KELP OBOE played by Darrell De Vore. Darrell writes, "The instrument used a large double reed that I used to buy commercially in Chinatown. It had six fingerholes and sounded

very much like a sahnai [North Indian conical oboe]. I also made nice vessel flutes out of the bulbs, and once did a beautiful subtle piece with dropped (tiny) kelp bulbs on bamboo."



length. There are four widely spaced tone holes, just barely reachable, one of which has a rough but effective lever-controlled key and pad. Between the tone holes and a register change (performed without benefit of a register key), there are six or eight available pitches scattered in an odd and evocative set of intervals between C below middle C (on a good day) and Eb above middle C. The timbre is profoundly melancholy.

KELP OBOES

Oboes, too, have conical bores. The western orchestral oboe has a double reed attached to a narrow, slowly expanding tube. Some eastern and middle eastern oboes use much more rapidly expanding bores, and these more closely approximate a typical kelp shape. It's not surprising, then, that a double reed attached to a seaweed horn usually produces a tone much akin to the piercing, nasal sound we associate with the middle east. Kelp oboes that I have made have been loud and harsh in tone. They work well with tone holes. Given my own virtually nonexistent skills as a double reed player, I can't assess their quality; perhaps an oboist reading this will make a kelp oboe and let us know what he or she thinks.

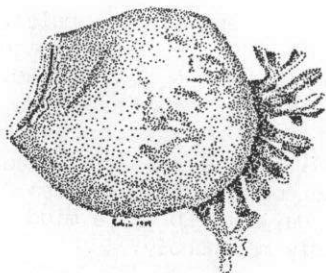
KELP FLUTES

Modern flutes use cylindrical bores rather than conical; historically, conical flutes have existed as well. One can make a kelp flute either by making a conical flute (or reverse conical, as

with a recorder) or by specially seeking out a reasonably cylindrical section of seaweed pipe. Robin Goodfellow (who made some of the illustrations for this article) has a large, side blown kelp flute she calls Mal de Mer. The bore shape is thick and somewhat irregular, and the tone is thick and low, a little like a globular flute. The end near the mouthpiece is stopped with clay. There are two tone holes. Robin also controls the sound at the far end, alternately covering, partially covering or uncovering the opening with the palm of one hand. This lets her shift between the open tube pitches and the much lower closed tube pitches, and to create glissandi in between. Several overblown pitches are possible in each position. What ultimately emerges is not so much a single scale of available pitches, but several inter-related sets of pitches, each with its own peculiar cluster of intervals arising from the quirky acoustics of the system. The instrument naturally suggests its own sorts of melodies that

reflect this. Robin has made a recording of a solo Mal de Mer improvisation which I love, and I've been long looking forward to getting this article published just so that we can include that recording in the next EMI cassette tape.

MAL DE MEER
(kelp side-blown
flute), and a RATTLE
made from a kelp bulb.



Robin Goodfellow

Robin Goodfellow and others have also made seaweed rattles, in the form of dried kelp heads, or bulbs, with pebbles inside. And that is the only non-wind instrument we'll mention in the course of this article.

PREPARING KELP FOR USE IN INSTRUMENT MAKING

Let us back up now and consider how to prepare fresh kelp for instrument making.

To make instruments that are to last more than a day or two, the kelp must be dried. The easiest way to get good dried kelp is to search the beach for well-formed naturally dried pieces. This has the great advantage that it is less work than collecting fresh pieces and drying them yourself, and also that you know just what you're getting (kelp changes form considerably as it dries). Finding naturally dried pieces has the disadvantages that it may be hard to find pieces that have dried well, and that they dry in randomly twisted

shapes. Those shapes may not be the shapes you want -- for instance, it's rare to find a perfectly straight piece naturally dried. On the other hand, the natural shapes are often quite beautiful.

Experience has led me to conclude that, on balance, finding naturally-dried kelp is the best way to go. But I have, with a lot of trial and error, gotten a handle on the home drying process, and I will describe the basics here.*

First, it should be allowed that drying kelp is like hatching chickens -- you never have a 100% success rate. So you have to start with more fresh kelp than you're going to need. A pickup truck load of wet, heavy kelp will, between shrinkage and attrition, reduce to a surprisingly small amount of usable dried product.

There is a single simple secret to drying kelp that makes the difference between reasonable success and assured near 100% failure. Before I figured it out I wasted a lot of work and several beach trips' worth of seaweed, raised a lot of noxious odors, and experienced a lot of frustration mixed in with the fun. Robin Goodfellow's experience was similar; she at one time had every door, window sill and ledge in her house covered with rotting seaweed that **just wouldn't** dry. It stank; it became slimy and disgusting; it weighed a ton. In the end she put it out with the garbage, leaving a six pack of beer beside the insalubrious mess that overflowed the can, as a sort of peace offering to the garbage collectors. Happily, the next day she found the beer gone and garbage can empty.

To save others similar experiences, I now reveal the secret of kelp drying. It is this:

Think of the kelp as an inflated balloon;
don't puncture it.

In its live state, in the sea, the hollow bulb and stem of the bull kelp are full of air; this is what makes the live plant float upright, reaching upward from its root at the ocean floor. Some kelp, when it uproots and washes ashore, is damaged and no longer air tight. This kelp will collapse on itself as it dries, and be useless for musical purposes. Other kelp plants manage to retain their integrity. These remain inflated as they dry in the sun; they don't collapse. Reason suggests that they lose some air as they shrink, but they retain enough so that the pressure within exceeds atmospheric pressure. As evidence of

* When I first undertook this project, I spoke to many people in hopes of hearing ideas as to how the drying might be done. The most interesting of these conversations was with Tom Stellar, preparator for natural history exhibits at the Oakland Museum in Oakland California. I happened, by luck, to speak to him shortly after the museum had mounted an exhibit on the California coastal marine environment, for which he had faced similar questions regarding the preservation of marine flora. He didn't have a definitive answer for kelp preservation -- in fact, for the exhibit he had in the end decided to use plaster models of kelp because kelp itself had proved so uncooperative -- but he did provide me with a great deal of related information, much of which is scattered about this article.

this, try breaking off a portion of the tail of a well-dried, intact kelp plant on the beach. You will hear an unmistakable "poofff!" as the trapped air escapes.

Knowing this, you can gather fresh, undamaged and air-tight kelp at the shore, transport it to some sunny location (taking care not to inflict any wounds along the way), and set it out for drying, confident of some degree of success. You can hang the plant by the tail from an arbor or roof overhang to let it dry straight, or you can lay it out in fancy, curly shapes of your choosing. In the latter case the results may not be as you envisioned, though, since the extreme shrinkage changes the picture quite a bit before drying is complete. Be careful in creating sharp bends -- kinks develop easily, even in a piece that was initially laid out kinklessly.

It might seem that a creative kelp drier would create wonderful, curly horn shapes at will. But, in my experience, the planned shapes of control-dried kelp never seem to be as beautiful as the odd, unpredictable forms of naturally beach-dried pieces.

In the early stages, the sun drying of kelp goes quite quickly -- in a couple of days of good, dry, sunny weather the plants lose most of their moisture and shrink to something close to their final form. But then that last little bit takes a disproportionately long time -- several more days, under good conditions.

The central difficulty here is this: kelp loves water; water loves kelp. Even after it has dried, kelp has an amazing capacity to reabsorb moisture. A perfectly dried piece, left out in high or even moderate humidity, quickly undries itself. As a result, it is important to either seal the kelp (more on that later) or move it to some very dry location as soon as it is dry. We can say the same, of course, for beach-dried kelp: don't give it an opportunity to reabsorb.

WORKING AND FINISHING

The dried kelp, whether beach dried or home dried, will remain reasonably stable as long as it remains dry. Some pieces are fairly strong; others may be thin-walled and weak in spots or all over. Yes, the stuff is fragile, but it is workable. It can be cut with a fine-tooth saw or a very sharp knife, or even scissors. It can be drilled using a small bit; holes can then be enlarged and shaped with a rotary burr bit, and then trimmed with an X-acto Knife. This ease of working means that you can make rough instruments very quickly; coupled with the inexpense and abundance of the material, this makes it good for experimental and learning purposes.

Some sort of protective finish on the kelp is essential; it preserves the kelp, strengthens it, improves the appearance, and, most important, prevents moisture reabsorption. Polyurethanes are effective. The kelp must be fully dry before application, and you will need to go over the piece with steel wool or a wire brush before finishing to remove salt deposits and a moss-like secondary seaweed that often appears on the sur-

face.

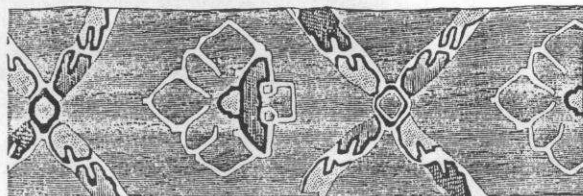
The way to finish kelp horns is in a huge vat. Get about twenty gallons of finish, dip the horns in there, and then hang them out to dry. Since that's not practical for anyone not engaged in mass production, various combinations of half-dipping, brushing and pouring or spraying are the options, and it's a messy job. The interior -- which must be especially moisture resistant -- can be done by pouring finish through, or better by stopping the narrow end and literally filling the horn with varnish, then letting it run out. Several coats are advisable. If any cutting or drilling occurs after finishing, newly exposed areas should be retouched.

The surface of some seaweed horns is rough; others are smooth. Colors range from a light buff to a dark grey brown; color on a single horn may be fairly uniform or mottled.

KELP CASTING

Yet another option: How about using firm, fresh kelp as an internal mold for some other material, by forming a castable or moldable material around the seaweed, allowing it to dry and then removing the seaweed? In some respects this procedure works rather nicely. The seaweed, having good tensile strength yet being flexible, can be pulled out to leave a hollow bore even if the tube shape is convoluted. It even accommodates the process by shrinking slightly and greasing itself (the skin gets slimy in there) to ease its removal. I tried this with a couple of materials. In particular I made some odd, gnarly looking things, really very pretty in their way, using fast drying auto body filler. They didn't work as musical horns, though, because it proved to be very difficult to glop the stuff on without leaving countless little air pockets and leaks along the air column. Someone with a better knowledge of casting techniques and materials would, I suspect, do far better with this. Jordan Hemphill, one of the long time kelp players whom I asked to comment on this article prior to publication, suggests that there could be further possibilities for a resourceful kelp caster using both plaster cast molds and sand casting techniques. These might include the use of both internal and external molds.

Bull kelp is great stuff. I have covered some of the possibilities here, but others no doubt have done more -- or may do more, perhaps inspired by this article, in the future. If so, EMI would like to hear about it.



"BUGBELLY" -- A T-RODIMBA EPB

by Tom Nunn

(continued from page 1)

plucking, etc.

The sounding board of a T-Rodimba EPB is a 2'x4' sheet of 3/4" plywood and is supported by a 1/2-inch diameter, 36-inch long steel pipe with 45-degree angle couple attached via floor flanges to the center of the back of the board and the base of the stand (a plate of wood). The "bug-belly" center portion consists of two curved rows of various length and diameter finishing nails outlining a "belly" of combs and textured surfaces. Below these is a set of five strings, light-weight music wire attached at each end to zither tuning pins. The strings do not utilize a bridge. At the top of the board on center, above the nails, is a "zing tree" (see photograph 1).

T-Rods

Since a description of EPBs may be found, among others, in an article I wrote for EMI in 1985 entitled "Meet Mothra" (please see references), I will devote the remainder of this article to the newly discovered aspect, and that which defines this type of electroacoustic percussion board, the T-rods.

On each side of the "belly" is situated a group of 11 T-rods, arranged in a V-shaped tier. Each rod is bent at a 90-degree angle, pointing upward and away from the player, and is attached to the board with nuts and washers, utilizing the threads of the rods. The longest rod is at the bottom (i.e., center of the tier), and successively shorter rods are placed above and to the left or

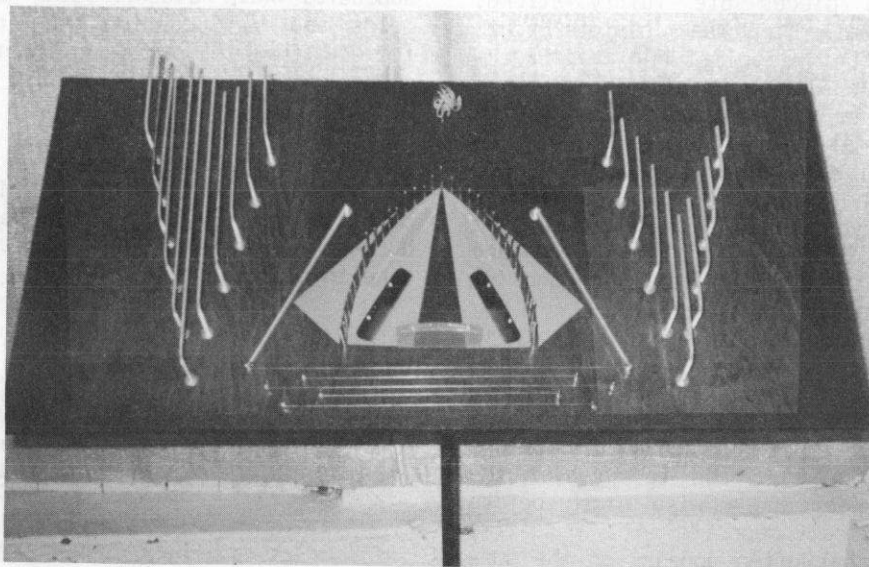
right. This idea is similar to the arrangement of keys, or tines, on the African mbira ("thumb piano"). The rods are normally struck on the side or top using the light weight rattan mallets with rubber "heads."

The contact microphone is placed on the back-side of the board, about 3 inches from the top edge, at the center. The use of an amplification system balances the dynamics throughout the range, allows processing of the sounds, and enables the T-Rodimba EPB to match the dynamic range of other amplified instruments. I use a FRAP (Flat Response Audio Pickup), a Peavy keyboard amp and a Yamaha rack mount digital delay.

There are three sections to each T-rod: the "stalk," the "crook," and the "extension" (see Figure 1). All rods are bent 90 degrees at a point 3-3/8" from one end and thus have the same stalk length. Since all of the rods have the same stalk length and consistent bend of the crook but have different extension lengths, the overtones, and therefore tone color, of each rod is slightly different.

I distinguish three types of rod based on the length of extension, each type having characteristic sound properties. The short rods (2.5 to 5 inch extensions) yield two distinct tones, the fundamental and an overtone sounding in the octave above A-440. The medium length rods (5 to 14 inch extensions) produce a weak or even inaudible fundamental and more prominent overtones. The long rods (14 to 18 inch extensions) are complex, almost bell-like, in sonority and have a prominent overtone in the middle register. I have attached a spring to the stalk of the two long rods, adding a special reverberant character to their sound. Each tier has only one long rod, located at the center, as mentioned above, two to four medium length rods, and the remainder short rods. The V-shaped arrangement of each tier ensures that a

T-RODIMBA EPB, also known as "Bugbelly."



portion (3 inches) near the crook of each rod will be exposed for easy striking from the side, rather than being blocked by adjacent rods. The horizontal distance between adjacent rods is 5/8"; the width of each tier (at the widest point, the top) is 7 inches. To enhance the visual appearance (and to use for special scraping sound effects as explained below), I apply triangular shaped pieces of black non-skid self-adhesive surface material to the soundboard surface as left and right borders and a 1/2-inch strip along the bottom edge.

Tuning the Rods

Since the rods have unusual, complex and inconsistent harmonic properties, tuning is the most difficult aspect of making the instrument. I choose to simply use my ear rather than a tuning mechanism (e.g. stroboscope), which is insufficient because it only responds to a single pitch. When there are two or more prominent pitches in the tone, as in this case, the tuning mechanism may pick out the loudest single tone, or it may get "confused," trying to respond to two different tones. Therefore, I find tuning by ear is most effective. Because of the unusual harmonic nature of these bent T-rods, "non-12-tone" intervals are inevitable, adding an attractive dimension to the pitch characteristics of the instrument. (And this is aesthetically consistent with "non-12" intervals that exist among the nails.)

My choice of pitches is purely aesthetic; that is, I do not rely on any particular tuning system.

To tune the rods, I bend them (clamped in a large vice) over a piece of half round (dowel) and cut the extensions to approximate lengths with a bolt cutter. Next I attach them to the board and fine tune them with the bolt cutter and a high-speed sanding disc. Adjusting the length of the stalk by a small amount (a few turns of the nut) is a final step in the tuning process.

Playing the Rods

The mallet I use with the T-Rods is a tapered rattan chopstick, 8-1/4 inches long, with a 3-1/4" length of surgical rubber tubing over the narrow end (as a mallet "head"), and weighs about 1/4 ounce. Electrician's tape is wrapped several times around the tip of the handle as a counterweight to the rubber head, providing better balance. The mallet is held between the thumb and first finger 1-1/2 to 1-3/4 inches from the end of the handle.

The "standard" way to strike the rods is from the side (side-striking) on the crook. This produces the full characteristic sound of the rod. However, side-striking the stalk (a bit below the crook) emphasizes the higher overtones and side-striking the extension (up to 2.5 inches above the crook) emphasizes the lower overtones and/or fundamental.

The two tiers are often both played at once, i.e., the right side column of both tiers, the left side column of both tiers, the "outside" column of both tiers or the "inside" column of

both tiers, thus increasing the number of possible tonal combinations.

Striking from the top, "down into the board," brings out the fundamental of the shorter rods or a muted harmonic of the medium and long rods. Strong upper register overtones may be brought out in all rods by top-striking at an angle (something between top-striking and side-striking) on the extension about one inch from the crook. Combining these techniques utilizes the full timbral range of these devices very effectively.

Extended Techniques

The sound of the T-Rodimba can be varied in a number of ways. The most obvious way, since it is amplified, is digital processing. But there are other means of attaining different timbral effects, such as muting. For example, the rods may be muted using such materials as a handkerchief (draped lightly over the tier). But my favorite is to place paper envelopes through the rods (over, under, over, under, etc.) and thus create a kind of muted mirliton sound (an idea I came up with shortly after reading the recent EMI articles on mirlitons [Volume V #1, June 1989]).

The use of knitting needles or combs to scrape the rods (using the threads as serrations) and scraping combs on the textured surfaces are ways of creating noise-like sonorities with the T-Rodimba. Strumming the stalks with mallets, needles, combs, or fingernails is effective. Tapping the tops of the rods with fingernails while dampening them with the hands is quite effective. And bowing the crooks is another extended technique. Combining these with digital processing extends the possibilities even further.

Future Development

I have devoted many hours experimenting with the T-rods in an attempt to find "the best" in them, particularly the arrangement of long, medium and short rods within the tier. Originally, I used more long and medium rods but found that to be less satisfactory than the use of predominantly short rods. The reason for this is partly the melodic nature inherent in the tiered arrangement, which invites the playing of fast passages and figures. Also, the complexities of the harmonics of the long and medium length rods can become too dense and confusing to the ear (to mine, at least). Therefore, I feel certain now that I have found an optimum arrangement of T-rods within the tiered format.

However, the center portion of the instrument, which contains all the other sounding devices -- the "belly" -- is an area still open to exploration. My first T-Rodimba EPBs had three tiers of rods and were originally intended to have only rods. This is a viable instrument and fun to play, but I found that the Bugbelly was much more to my personal liking in that it offered so many more sonic possibilities, as had my other EPBs. Since I had built two of the three-tiered instruments, I decided to take out the middle tier of

one of them and re-design that portion. I placed bolts in the holes originally occupied by the rods and attached music wire to these, with the tuning pins at the top center of the board, making an 11-string harp out of that area. Surrounding this harp are two curved rows of nails (44 nails in each row) coming to a point at the bottom center of the board (an inversion of the curved rows of nails on the Bugbelly). I restrained myself from adding combs because of the visual simplicity and attractiveness of the harp and nail design (see photograph 2).

This center portion of the T-Rodimba EPB is going to be the subject of my future experimentation, as well as various T-rod tuning arrangements.

One final note: I made two attempts at a smaller instrument (rectangular, about 2' x 1½') employing the 90-degree bent T-rods. One had a single tier with strings on either side and five combs. The other had two tiers. Neither instrument was satisfactory, particularly the latter, which failed miserably because the rods had no resonance, they just sounded "clunky"; this instrument was subsequently disassembled. I mention this so that no one will waste their time and materials trying it. Though it is always disappointing to find an idea does not work, that "goes with the territory," as they say, when experimenting, and should never deter one from trying new ideas.

I invite anyone interested in exploring, designing or building T-Rodimba EPBs, or anything remotely related to them, to contact me so that we may share our thoughts and insights, our frustrations and our delights.

Tom Nunn can be reached at 3016 25th St., San Francisco, CA 94110.

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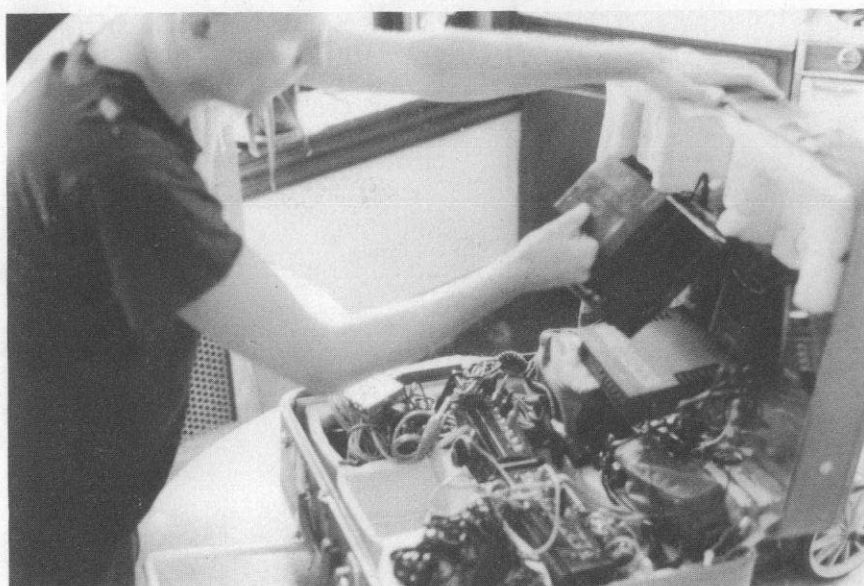
This is a portable concrete mixing studio consisting of a suitcase filled with electronics weighing approximately 43 pounds and generally pulled on a metal frame with wheels; a back-pack containing four speakers, a PXL-2000 Vaudio (i.e.: video) camera/vcr wrapped in a shirt (in this instance with "I LOVE STRING USIC" written on it), two drum-sticks, a small cymbal, and, sometimes, an AC powered amplifier, a 25 foot heavy duty extension cord, and a multi-outlet strip -- weighing about fifteen pounds; and a box capable of holding about sixty cassette tapes.



Photos by John Berndt



The suitcase is laid horizontally on its metal carrying frame and its three front flaps are unlocked to reveal two red plastic mouths each on a white plastic background (these are the fronts of Blabbermouth Radios) on either end -- with a recessed tv in the middle.

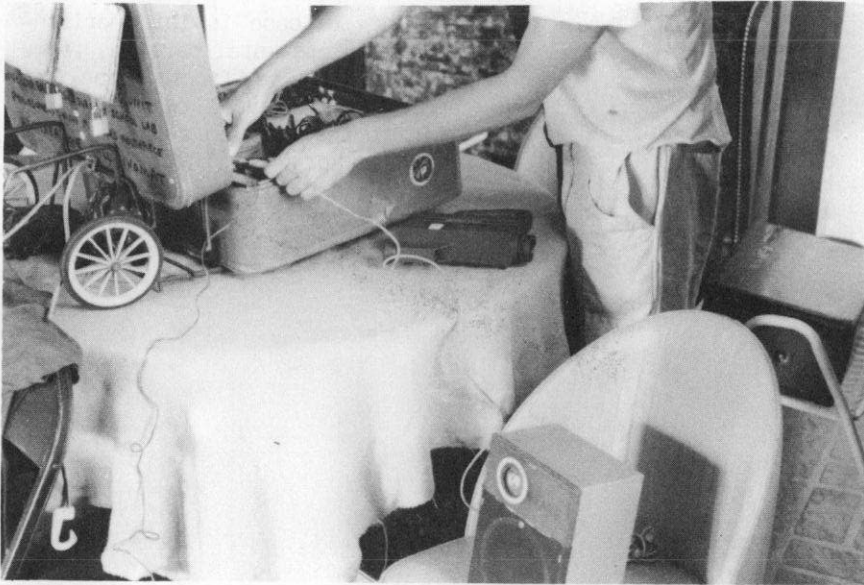


The suitcase is unlocked and opened so that the front is vertical and facing the audience, and the tv is fit into the middle hole. The electronics are thusly revealed.

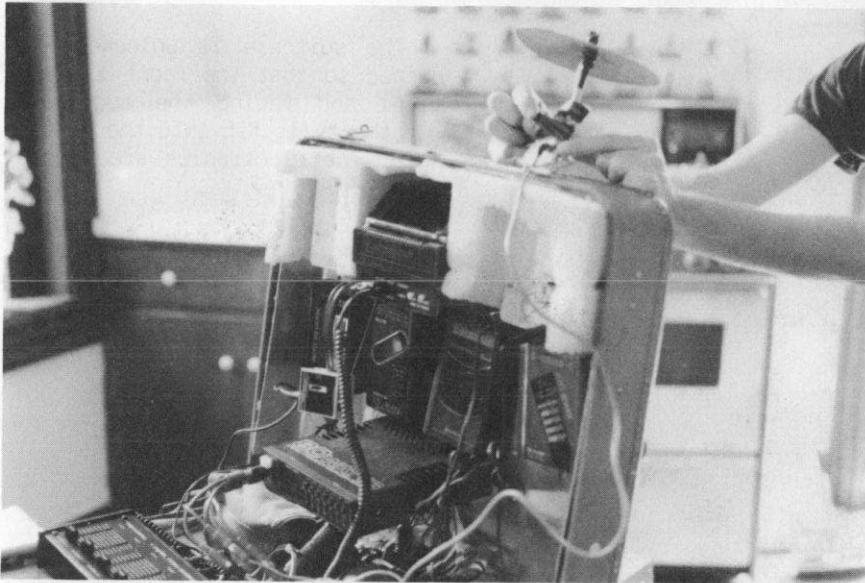


The back-pack is opened and the two-way speakers (40 watts, 8 ohms, frequency range 50 -14,000 cps -- with fake tweeters), t-shirt, camera/vcr, and percussion equipment are removed.

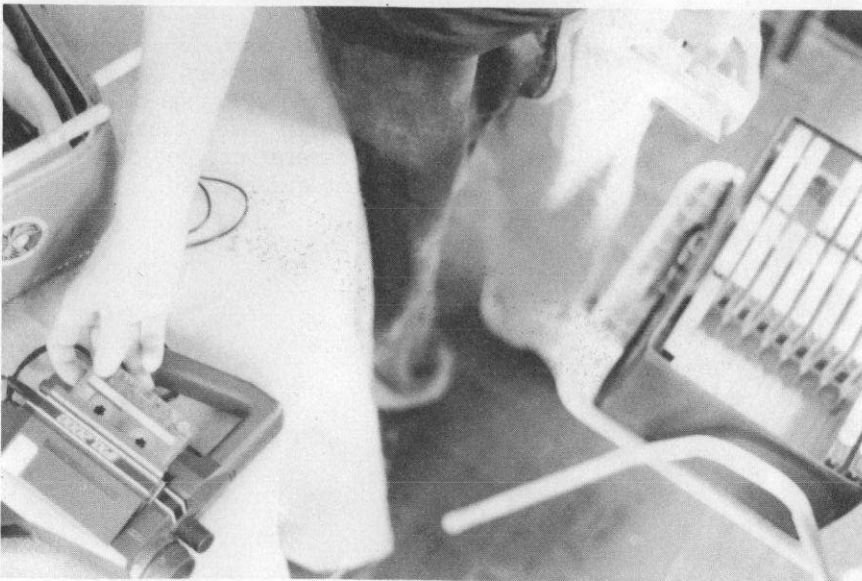
The speakers and vcr are plugged into the suitcase.

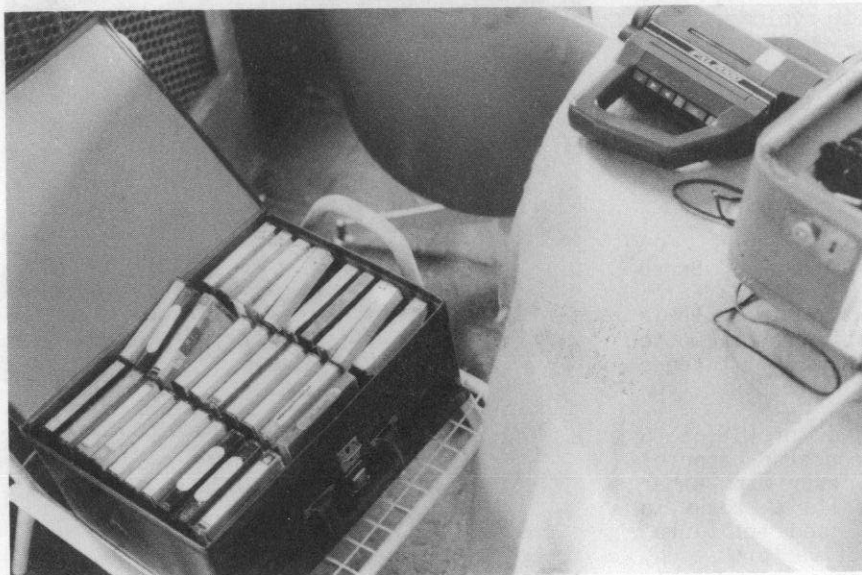


The cymbal is placed on top of a ball-point pen which is taped to a lock flap which has a piezo sensor contact mike taped to it to enable the cymbal's amplification.

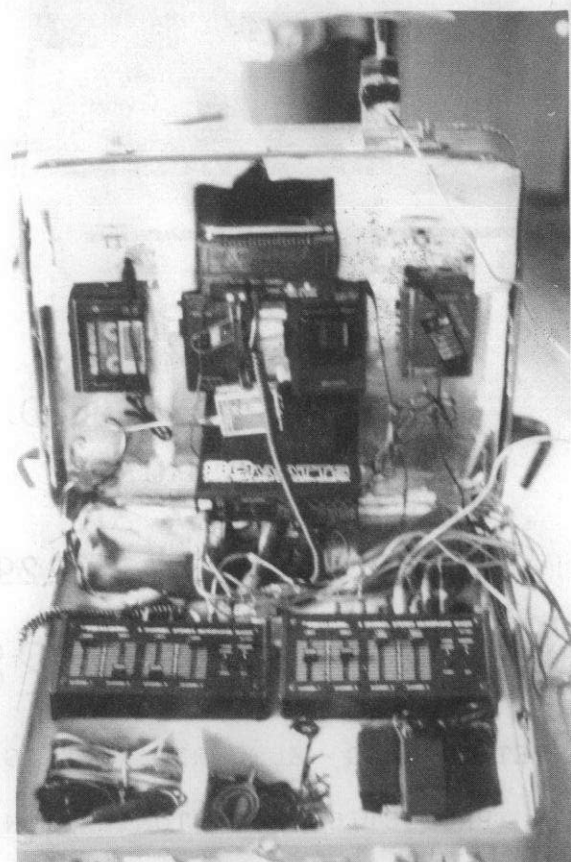


One side of the tape-carrying case contains Vaudio tapes for the PXL-2000. These tapes all contain black and white close-ups of mouths talking about their philosophies -- i.e.: they are all Philosopher's Union Member's Mouthpieces. One is selected and placed in the vcr/camera to be played through the tv.





The flip-side of the carrying case contains all audio tapes specially made or chosen as Usical Materials. These tapes are made or chosen to provide "randomly" excerptable conceptual and sound-emphasized content, e.g.: a tape made by electronically manipulating BBC "Transitions and Cues" sound effects is included for an extrapolation of its original BBC function; a tape made from playing blades of grass is chosen for its piercing "linear" qualities; a tape of an anti-CIA radio talk show conspiracy theorist is chosen for its voice-over political potential; and a short loop of dogs yowling is used for its potential "non-lingual" emotive content. Four tapes are chosen and placed in the tape players.



The suitcase itself contains the above-mentioned four tape players, which are also AM/FM radios, and various other equipment. Three of the players are auto-reversible, one of them records, and two of them have equalizers. They are all stereo and have their outputs going into the line inputs of two 4-channel mixers. One of the players is reduced to mono via a Y-adapter to free one of the line inputs for the sound from the monitor/tv. The mike inputs have one or more contact mikes plugged in -- to amplify the cymbal, the body of the suitcase, my voice, other people's instruments, etc. -- and to enable the creation of feedback. The output from the mixers is Y-adapted to stereo and routed into an 80-watt car amplifier /equalizer -- which plays out through the four speakers. The mixers and the amp's fader allow various types of panning. The amp/equalizer, the tv/monitor, and the PXL-2000 vaudio camcorder are all powered by two rechargeable battery packs good for about an hour or two of power. Various other relevant accessories -- such as electrical tape, rechargers, etc. -- are included.

The Busking Unit (so called because its self-contained power and portability enable it to be used busking --i.e.: street-performing) is played by combining the tapes, radio sounds, percussion, voice, PXL-2000 tapes, etc. together through the mixers and altering their tonal qualities with the equalizers etc. through a process that I call concrete mixing

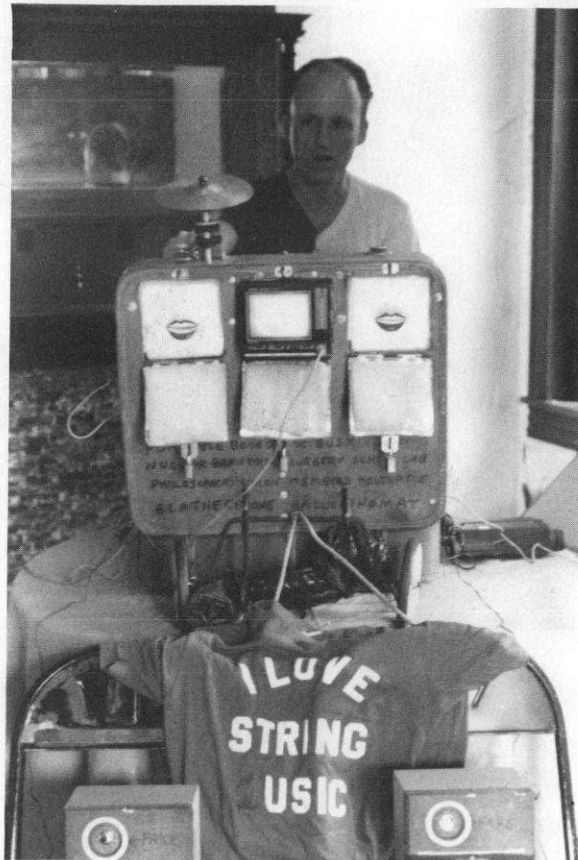
-- i.e.: a production of something akin to "Musique Concrete" through mixing -- without strictly musical intentions. The auto-reverse capabilities make possible a specific type of rhythmic play. The Philosopher's

Union Member's Mouthpiece shown on the central monitor/ tv is flanked by the other two mouths which open and close in sync with the variations in volume. This Blatnerphone Hallucinomat was conceived of and built by TENTATIVELY, a CONVENIENCE (and here explained by) with the indispensable and ever-generous assistance of Dave Guercio in early 1988ev.

TENTATIVELY, a CONVENIENCE is the originator of Boood Usic (rhymes with mood music). Usic, in TENTATIVELY's terminology, is something that is used, and the word is usually applied to sound. Usic is distinct from music in that it makes no claim to aesthetic value. It tends to be unpopular and often evokes a booing response from listeners and participants.

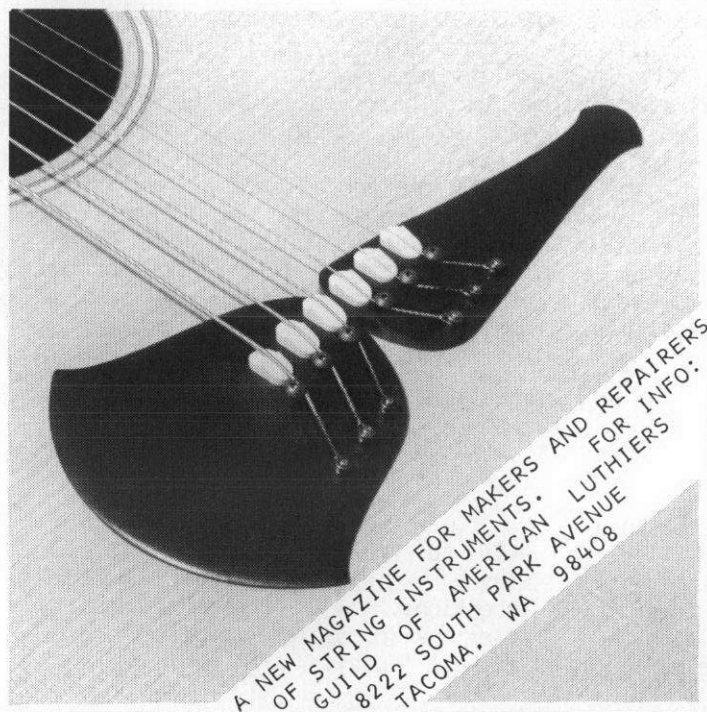
TENTATIVELY is also currently director of Widemouth Tapes, which produces and distributes cassette tapes of audible materials that would not find favor with other publishers. The label was founded by Chris Mason in connection with a thinkers', artists' and activists' collective in 1978. When the collective broke up, Widemouth passed into TENTATIVELY's hands, and he has kept its catalog available and added some new issues. The label has always been seriously underfunded, and this is reflected in poor sound quality in the earlier tapes (recent releases have been better). The prevailing aesthetic accommodates this. Releases include music, spoken word, and less categorizable material.

TENTATIVELY a CONVENIENCE and Widemouth Tapes can be reached at Box 382, Baltimore, MD 21203.



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The Quarterly Journal of the Guild of American Luthiers



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CASSETTES

Notes by Bart Hopkin

Here and in coming issues EMI will be presenting short reviews of independently-produced cassettes featuring unusual musical instruments. "Independently-produced" here means produced by the artist or by a small organization without benefit of an established record company or distribution network. The reviews are designed to be informative rather than critical; we've simply tried to indicate what is on the tapes and where to get them. The purpose is to let readers know what sort of instrumental sounds are available on tape within EMI's diverse creative community.

VARIOUS ARTISTS:

RATIONAL MUSIC FOR AN IRRATIONAL WORLD

Produced by the Just Intonation Network, 535 Stevenson St., San Francisco, CA 94103, \$10.

This is the Just Intonation Network's most recent compilation of music in just intonation from diverse composers. About half of the seventeen pieces appearing here were realized on computers and synthesizers. Among those that were not so realized: David Canright's Guitar Suite and Eric Ridgway's Loved and Lost, both for refretted guitars; Robert Rich's Temple of Eyes which uses steel guitar, dumbecs and a sampled mallet kalimba; Harry Partch's Ulysses Departs from the Edge of the World, with trumpet and bamboo marimba (boo); and Lou Harrison's Air for the Poet, played on a metallophone built by Bill Colvig.

An earlier compilation by the Just Intonation Network appears as issue #14 of the audio cassette magazine Tellus, c/o Harvestworks, 16 W. 22nd St. (902), New York, NY 10010.

BRACEA INSTRUMENTS: TORUS / PERIPTYERY

Bractea Instruments, 37 Haight St., San Francisco, CA 94102.

Rick Sanford produces hand-hammered tuned bronze gongs under the name Bractea Instruments. This recording is a 46-minute improvisation on a set of thirty gongs from all over the world.

PICTURE NOISES FROM THE GLOBAL SWAMP

Produced by Colin Hinz, ASFI, 349 West St. N. Apt. #3, Orillia, Ontario, Canada L3V 5E1.

This is an aural documentation of the 3rd Annual Intergalactic Festival of the Swamps, which took place in Madison, Wisconsin 1988. Festival of the Swamps was conceived as a counterbalance to Madison's Festival of the Lakes, a prominent arts festival which, in the view of the Swamps organizers, neglects younger or experimental artists and "reeks of corporate pandering." The swamps festival, accordingly, is rootsy and participatory and

pretty wild. This recording captures percussion jams, sound sculpture noises, various spoken and sung improvisations and such, all with lots of unrestricted contributions by crowd members, referred to in the notes as swamplings. Clever packaging allows for more complete written documentation than normally fits in a cassette.

THE GLASS ORCHESTRA: HUMAN

Canadian Music Center Distribution Service, 20 Joseph St., Toronto, Canada M4Y 1J9

This is the most recent recording by the Glass Orchestra, who perform exclusively on instruments made of glass. Included are percussion, friction and wind instruments in a remarkable diversity of sounds.

BOB GRAWI'S GRAVIKORD ENSEMBLE: RISEING TIDE

White Bear Enterprises, 247 West 16th St., New York, NY 10011, \$11.

Bob Grawi's GraviKord is an electroacoustic string instrument similar in arrangement to a Kora, with two rows of diatonically tuned strings. On this tape it is joined by flute, bassoon, kalimba, recorder, marimba, tabla, dumbek and a few more instruments. The liner notes describe the music as "polyrhythmic new folk," and this is a reasonably accurate description: the influence of kora music is everpresent, yet the material is often based in American and British Isles folk styles.

UNDERCURRENT: TRIG P*TOMA

Piranha Productions, 506 West Johnson Dr., Payson, AZ 85541, \$5.

"This tape was made by physically destroying acoustic sound sources, with conventional instruments being: None" according to the liner notes. Since I managed to convince Bill Jaeger, the main force behind this music, to tell me a little more about how this tape was made, I'll give a little more detail here.

Most of the original sounds were recorded on a boom box cassette deck, then dumped to a 4-track for mix down. The sounds were recorded at various remote locations in Arizona. Some were later treated with analog delay; also some are played back in reverse or looped. Some of the sound sources are freeway noise, short wave radio sounds, telephone operators, squeaking doors, ambient noise from various public places, wolf howls, Bill Jaeger's voice, and the usual array of pots and pans, larger metal objects, plastic buckets and such. The composite effect is usually flowing and sculptural; sometimes big or dense sounding but rarely violent.

Two previous cassettes have been released by Undercurrents; a fourth is expected this year.

AND STILL GOING STRONG

By Bart Hopkin

With this issue Experimental Musical Instruments enters its sixth year of publication, and the time has come again for our annual stop-and-take-stock talk. EMI has been on a fairly steady tack over the last year, and, indeed, since its inception; and so what I have to relate now is not very different from what has appeared in previous years at this time. But it doesn't hurt to review these things once a year, so please bear with me.

EMI remains the only periodical devoted to the broad range of interesting and unusual acoustic and electroacoustic instruments. Subscribership at last count stood a little under 600. Day-to-day operations in the production of the newsletter remain optimistic and stable, except that, as always, we would love to have more subscribers, to broaden our world and also lubricate the cash flow situation a bit. So if you support what we're doing, please tell a friend.

EMI looks to its readership for much of its direction and content. There are many ways that the community has input into the newsletter, and I encourage everyone to continue to take advantage of them. Letters to the editor are always welcome, and are a good way for individuals to communicate with the readership as a whole. We also welcome suggestions for article topics, publications or recordings for review, ideas for improvements in the newsletter, and so forth. Remember that subscribers can place ads or other blurbs of up to forty words in the notices column free of charge. And, though we do tend to get more than we can print, we are always interested in article submissions. Our best pieces have come from readers who see in EMI an opportunity to share some valuable knowledge or ideas. (If you do think of writing something for EMI, call or send a query letter before undertaking major work).

Allow me to insert here a brief sales pitch: EMI's back issues, from Volume I #1 on down, are full of material that is as valuable now as it was when it first appeared. All of those issues remain available. EMI's first four tape compilations, containing music of instruments featured over the years in the newsletter, also remain available, and the fifth is being released concurrently with this issue. Purchase information appears elsewhere in this issue.

PEOPLE

Who puts EMI together? Subscribers occasionally express some curiosity about this.

EMI is the product of an editor, a four-person editorial board, a couple of on-going part-time associates, and the large, ever-growing and changing pool of generous people who have contributed their articles, artwork, ideas and time over the years.

The editor -- that's me -- actually does most

of the day-to-day work that keeps EMI going -- the correspondence, record keeping, order filling, errand running, cutting and pasting, and a million other things (including some writing). Our proof-reader is Janet Gillies; she also keeps the accounts, efficiently and legibly, using a hand-held calculator. Two of the editorial board members are called on frequently in the course of day-to-day operations. One is Roger Hoffmann, whose resumé includes promotional and advertising work with several larger magazines. He provides a professional perspective on all aspects of EMI's editorial approach, its look, its place in an odd and elusive market, its successes and failures and prospects. The other is Donald Hall, a professor of musical acoustics at Sacramento State University and author of the excellent standard text **Musical Acoustics: An Introduction**. He is EMI's most important referee. We send him, prior to publication, all articles touching on technical aspects of acoustics. He reviews them to ensure that inaccurate or misleading acoustic analysis does not find its way into EMI. We also occasionally turn to him for his clear and thoughtful responses to diverse technical questions.

Another central figure in the production of EMI is Robin Goodfellow. The stippled drawings that appear frequently in these pages are Robin's; so are occasional graphics in other styles. Robin, with an extraordinary instrument collection of her own, has also been the source of a stream of ideas and information that have found their way into EMI's pages, sometimes inconspicuously and sometimes quite prominently. Our recent articles on balloon instruments, mirliton instruments, and eggshell instruments, for instance, all had their origins in promptings from her.

In addition to these people of more or less official status in EMI's organization, I'd like to recognize here a number of EMI's most generous friends. These are people having no formal position in the organization, but who have consistently contributed to our effort. Where to begin? Tom Nunn, here in the Bay Area, has not only written several articles about his own instruments for EMI, but has been in countless ways a great conduit, a great connecting force, between individuals in a rather disjoint world of musical explorers, and always a positive spirit. Hal Rammel in Chicago wrote the very important article we had a while back on one man bands, as well as a substantial body of deeply thoughtful correspondence in EMI's letters column; we've also managed to sneak in several of his quirky cartoony graphics over the years. I thank David Courtney's article on the Indian builder Nageshwar Rao for causing me to re-think the concepts of tradition and innovation; David, from Texas, has also written for us on computer processing of acoustic signals and on Indian drumhead making, and is serving as an author and consultant in a coming article on comparative scale systems. Ivor Darreg in San Diego has consistently provided both information and provocative commentary on a range of topics; his letters as well as articles on and references to his work have been a recurring feature in this pages. Tony Pizzo in Vermont has

been a constant source of in-the-know on publications and literature in the field of musical instruments; he is another whose behind-the-scenes contributions have been many, dependable and invaluable.

The list, of course could go on. Hugh Davies, Rick Sanford, Francois Baschet, Denny Genovese, Darrell De Vore, Buzz Kimball, Ernie Althoff, Charles Adams, Matthieu Croset, Richard Waters, Bob Phillips, John Chalmers, all have given much, and given much again. Whom have I omitted? Many. To all who have contributed in all the ways you have contributed, EMI says thanks.

Welcome to EMI's year number six. We have lots of good things coming.

NOTICES

The FOURTH ANNUAL SAW PLAYERS AND FRIENDS PICNIC will take place at Harvey West Park, Santa Cruz, CA on Sunday, July 15, 10:00 AM - 6:00 PM. Workshops, jamming, open mike, pollock lunch. \$5.00 donation. For information call (415) 523-4649 or write 1821 St. Charles St., Alameda, CA 94507.

NEW JOURNAL OF SOUND: The Aerial is an ongoing "journal in sound", a series of compilations of various kinds of recorded activity leaning towards the experimental. Issue #1, now available, is \$12 on CD or \$8 on cassette, postpaid. A four issue subscription costs \$40 for CD, \$30 for cassette, from Nonseq./What Next? PO Box 15118, Santa Fe, NM 87506.

And another offering: SOUNDVIEWS: SOURCES is a cassette-only anthology of 39 audio artists who work outside the bounds of "music" per se -- people who do installations, build instruments, work with environmental sound, etc. \$8, post paid, Nonseq./What Next? at the address above.

SONIC.DISTURBANCE: The 2nd annual festival of sound at Cleveland Public Theatre continues its commitment to little-heard audio art, new music, sound sculpture, performance poetry and more. Mini-festival June 7-10; major ear-bender Sept. 12-23, 1990. For information write Sonic Disturbance, 1607 Clark Ave., Cleveland, OH 44109; or call (216) 621-8738.

LOOKING FOR A THEREMIN, updated schematics, background information, a kit with parts. Help! Arthur M. Scholtz, 348 Charles St., Yaphank, NY 11980.

THE ONLY BOOK IN SAWING: Scratch My Back: A Pictorial History of the Musical Saw and How to Play It, by Jim Leonard and Janet Graebner. Features profiles of sawyers world-wide in 124 pages of fascinating information. Includes over 100 photos and illustrations, index and bibliography. U.S. Dollars \$19.95, \$3 shipping/handling (in CA add 6% tax). For information, contact Janet E. Graebner, Kaleidoscope Press, 1601 West MacArthur, #12F, Santa Ana, CA 92704.

MICROTONAL MIDI TERMINAL by Denny Genovese is a real time performance program for just intonation on virtually any MIDI controllable musical instrument; also a powerful tool for analyzing & constructing microtonal scales. System requirements: IBM PC, XT, AT or compatible with 128K, DOS, Roland MPU-401 or compatible MIDI interface, MIDI controller and MIDI controllable musical instrument. \$50. Denny's Sound & Light, PO Box 12231, Sarasota, FL 34278.

JUST INTONATION CALCULATOR by Robert Rich. Composer's tool for JI. Internal sound for tuning reference; shows modulations; reduces fractions; converts between ratios, cents, DX7II/TX81Z units; MIDI tuning dumps. Requires Macintosh with Hypercard -- only \$10.00. Soundscape Productions, Box 8891, Stanford, CA 94309.

EMI BACK ISSUES: Back issues of Experimental Musical Instruments numbered Volume V #1 and later are individually available for \$3.50 apiece. Earlier issues available in volume sets of 6 issues each, photocopied and bound: Volumes I through IV, \$14 per volume. Order from EMI, PO Box 784, Nicasio, CA 94946, or write for complete listing. Corresponding cassette tapes also available for each volume; see information below.

CASSETTE TAPES FROM EMI: From the Pages of Experimental Musical Instruments, Volumes I through IV, are available from EMI at \$6 per volume for subscribers; \$8.50 for non-subscribers (each volume is one cassette). Each tape contains music of instruments that appeared in the newsletter during the corresponding volume year, comprising a full measure of odd, provocative, funny and beautiful music. Order from EMI, Box 784, Nicasio, CA 94946.

MAKE A FLUTE!, a 32-page softcover book by Mark Shepard, offers general guidelines on designing flutes, plus tips on working with the material of your choice. Mark Shepard is the author of Flutecraft and How to Love your Flute: A Guide to Flute Playing. Make a Flute! can be ordered from Simple Productions, 12 East 15th St., #3, Arcata, CA 95521, for \$5.00 U.S. postpaid.

URBAN SPACE EPICS is a culmination of years of experimentation with Kalimba tunings, extended vocal techniques and intensive research into ancient world poetry. The epic-songs (improvised poems along a loose structure of dramatic points and archetypal images) include "Song to Ishi", "L.A. Woman Meets Maria Sabina", "The Possum", and "Lullaby". An instrumental "Walking" is performed on a Kalimba using a tuning found among the peoples of Mozambique. The final work on the tape, a satirical rant entitled "Out on Insanity," is dedicated to Lenny Bruce. Urban Space Epics by Darrell Jonsson is available from Missing Link Music / 6920 Roosevelt Way N.E. #328, Seattle, WA 98115 for \$6.50 + \$1 postage.

TWO GIRL OSTRICHES were being chased by two boy ostriches. "What'll we do!?" says one in panic to the other, "We're being chased by two boy ostriches!" "Let's hide our heads in the sand," says the other. So they hide their heads in the sand. Arriving at the scene a moment later, the two boy ostriches in bewilderment ask, "Where'd they go? Where'd they go?"

DIDJERIDUS -- Play this aboriginal wind instrument yourself. Find out why composers & players of avant garde and experimental music are re-discovering the oldest wind instrument in the world. Instructional cassette included. \$85.00. For information call or write Fred Tietjen, 26 Allen, San Francisco, CA 94109; (415) 474-6979.

NATURE SOUND RECORDING WORKSHOP: The Nature Sounds Society will be holding its 6th Annual Field Recording Workshop on June 15 - 17 at SF State U Field Station, Yuba Pass in the Sierra Nevada Mountains, California. Speakers include recordist/producer Jonathan Storm, Professor Emeritus/Biology Dr. Robert Bowman, bird song recordist & ornithologist Dave Cornman, and Nagra service specialist Dan Dugan. Workshops, demonstrations, field recording opportunities for both beginning & experienced recordists. For more information call (415) 549-9364.

SAMPLER HOME USERS ASSOCIATION is an organization devoted to study and enjoyment of the possibilities and/or uses of the sampler as a technical instrument for creation, through the establishment of an international network for exchanging recordings. For more information contact Francisco Lopez, Apartado 2542, 28080 Madrid, Spain.

FOLK HARP CONFERENCE MINNESOTA takes place July 18-21, 1990, Augsburg College, Minneapolis. Sponsored by the International Society of Folk Harpers and Craftsmen. Information: Gaylord Stauffer, PO Box 4203, St. Paul, MN 55104 (612) 724-8071.

EMI will be doing a series of short reviews of independently produced cassettes now and then in the next several issues. No value judgments; just information on what's available and where to get it. If you have produced a cassette featuring unusual instruments, send a copy to EMI, Box 784, Nicasio, CA 94946, with brief information on instruments appearing, and price if relevant.

RATIONAL MUSIC FOR AN IRRATIONAL WORLD is the new compilation cassette tape from the Just Intonation Network, featuring 18 compositions in Just Intonation by members and friends of the network. \$9.98 (\$8.98 for network members) from The Just Intonation Network, 535 Stevenson St., San Francisco, CA 94103.

A REMINDER -- Unclassified ads here in EMI's notices column are free to subscribers for up to 40 words; 30 cents per word thereafter. For others they are 30 cents per word, 15 word minimum, with a 20% discount on orders of four or more insertions of the same ad.

The following is a selected list of articles of potential interest to EMI readers which have appeared recently in other publications.

OPENING THE DOOR TO THE NINETIES: ANNUAL REPORT, FEBRUARY 1990, by Ivor Darreg (3612 Polk Ave., San Diego, CA 92104).

Each year Ivor Darreg puts out his Annual Report, a compendium of his activities, ideas and opinions in the realm of musical exploration as they have developed over the preceding year. This year's report is a 50 page document, covering a wide range of topics, including: higher-order equal temperaments, the concept of elastic tuning (electronic instruments designed to adjust the tuning of each chord as it sounds), the opportunities opened up by user-programmable music computers and synthesizers, analysis of telephone push button scales, conduit marimbas, the potential of amplified clavichords, the megalyra family of electroacoustic string instruments, and more. As always, there are also discussions of Ivor Darreg's networking connections, information on pamphlets and recordings he has produced, and pithy comments on the bullheadedness of the classical music establishment.

ARTICLES ABOUT MUSICAL INSTRUMENTS, compiled by Carolyn Bryant, in Newsletter of the American Musical Instrument Society Vol. XIX #1, Feb. 1990 (414 E. Clark St., Vermillion, SD 57069-2390).

A listing of musical instruments articles that appeared in 1987 and 88 in diverse publications. Also in this issue of the AMIS Newsletter are information about musical instruments acquisitions at various museums, and photographs of diverse instruments.

BODY SOUND: OTHER MUSIC AT ARTSPACE by Kenneth Baker in The San Francisco Chronicle, March 3rd 1990.

A review and photograph of "Mechanical Sound orchestra," a sound installation by Matt Heckert at San Francisco's Artspace. It is a computer-driven set of acoustic sound sources, including rotating metal rings, drums, and friction-sounded strings, all on a large scale. The sounds are electronically processed.

A LITTLE SYMPOSIUM ON THE SYMPOSIUM: Excerpts from a conversation between Norbert Ruebsaat and Hildegard Westerkamp on the outdoor events at the 1988 Sound Symposium in St. John's, Newfoundland, in Musicworks 45, Winter 1990 (1087 Queen St. West, Toronto, Canada M6J 1H3).

Sound Symposium is a bi-annual festival of sound exploration and sound arts. This retrospective article highlights three environmental pieces: the daily harbor symphonies composed by various people and played on the horns of ships that happened to be present in the harbor, Don Wherry's "Bells" for churchbells, boathorns and alphorn, and Gordon Monahan's "Aeolian Piano," a piano placed on a rocky bluff with strings exposed

to sing in the wind.

The following article in the same issue, NEWFOUNDLAND'S UNIQUE AUDIO-VISUAL LAB: ORGANIZING THE SOUND SYMPOSIUM, has more information on the festival. The 1990 Sound Symposium, meanwhile, will run from July 4 - 14; see page 3 of this issue of EMI for more on that.

Several valuable articles appear in Glass Music World Vol. 4 #2, April, 1990 (2503 Logan Dr., Loveland, CO 80538):

SASCHA RECKERT MODIFIES OLD PRINCIPLES INTO NEW INSTRUMENT (no author credited) describes the Verrillon, a set of musical glasses using glass tubes (5 cm in diameter; ranging in length up to about a meter) in place of wine glasses.

GLASS IN THE PAST is a passage reprinted from Friedrich Rochlitz' 1798 treatise, "On the alleged harmfulness of harmonica playing," discussing the alleged relationship between glass harmonica music and nervous disorders.

TECHNICAL TOPICS by Normal Rehme is a regular column; in this issue it discusses aspects of the author's recent experiences making a glass harp.

SONOR PERCUSSION'S LEGACY OF EXCELLENCE, in The Music Trades Vol. 138 #3, April 1990 (80 West Street, Englewood, NJ 07631).

A report on drum making operations at Sonor Percussion, including lots of photographs from the factory floor. Also discussed is some of the history of the Sonor Company, taking us through a century of turbulence in Europe.

CONTACT COLUMN, in Newsbeat, a small promotional magazine for the Sabian company, bound into The Music Trades Volume 138 #2, March 1990 (address above).

This is a Q&A column. A couple of Qs concerning the shaping and finishing of cymbals and their effect on resulting sound are answered briefly but informatively.

H23 #2, Winter 89-90 (PO Box 592, Pullman, WA 99163-0592) has appeared, with interviews with Liz Was and Miekal Ånd (whose activities are to diverse to review here but which do include lots of sound source experimentation), surrealist musician Randy Grief, and other experimental musicians & artists. Included is a vinyl record with four sound pieces on it; fine music though it's hard to tell which is by whom.

FATHER AND SON GOURD MUSICIANS (no author credited) in The Gourd, Vol. 20 #2, Spring 1990 (PO Box 274, Mt. Gilead, OH 43338). A report on the work of Tennessee builder T.N. Garland, who has made over a hundred gourd dulcimers modeled after one originally made and played by his grandfather. "He's an innovator within a tradition."

Also in this issue of The Gourd: a short piece and a photograph of Minnie Black and friends with some of her wonderful gourd instruments.